

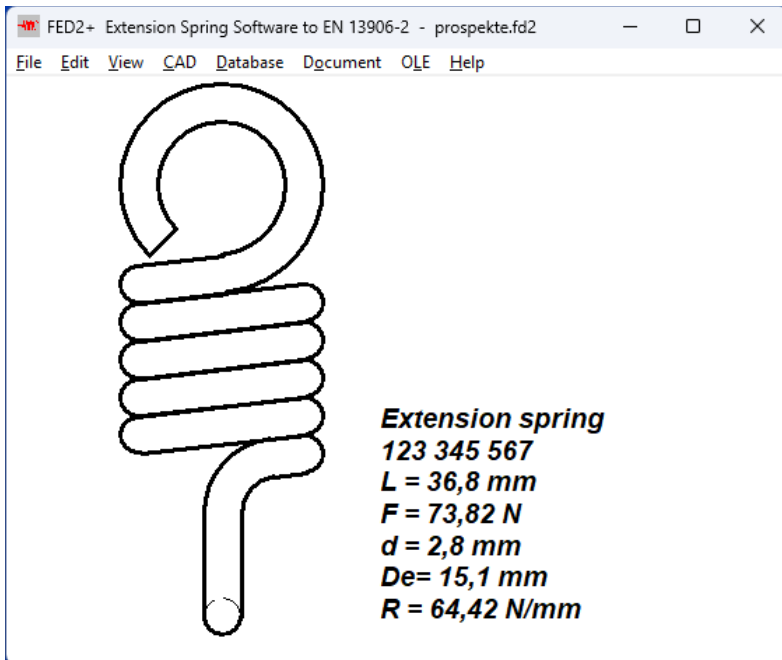
# FED2+



## Software for Calculation of Helical Extension Springs

for Windows

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### Extension Spring Calculation

FED2+ calculates cylindrical extension springs in accordance with EN 13906-2. Spring characteristic curve, Goodman diagram and temperature diagram can be graphically represented. Scale drawings of the spring, as well as production drawings can be exported to CAD via DXF and IGES interface. FED2+ also contains a spring database with catalogue springs, calculation of relaxation, extension springs made of rectangular or elliptic wire, and animation of the spring on screen.

### Calculation

In dimensioning, extension spring is calculated from spring loads, stroke, coil diameter and clamping length. In re-calculation, existing springs can be calculated by inputting dimensions. All necessary elements, such as spring forces, extensions, spring rate, spring energy, stresses, wire length, natural frequency and weight are calculated. The greatest and smallest possible wire diameters can be interactively calculated.

### Material Database

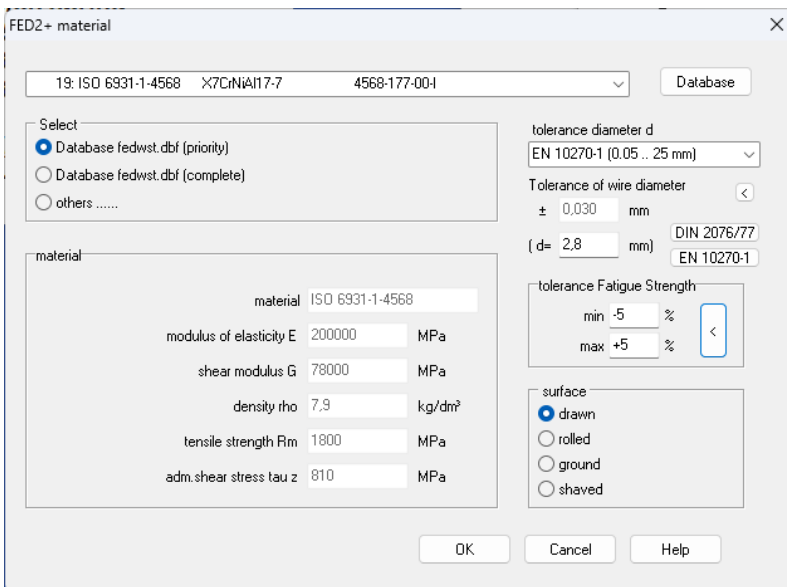
The software obtains the spring material properties from the integrated material database (tensile strength, admissible shearing stress in relation to wire diameter, shearing modulus, modulus of elasticity, density).

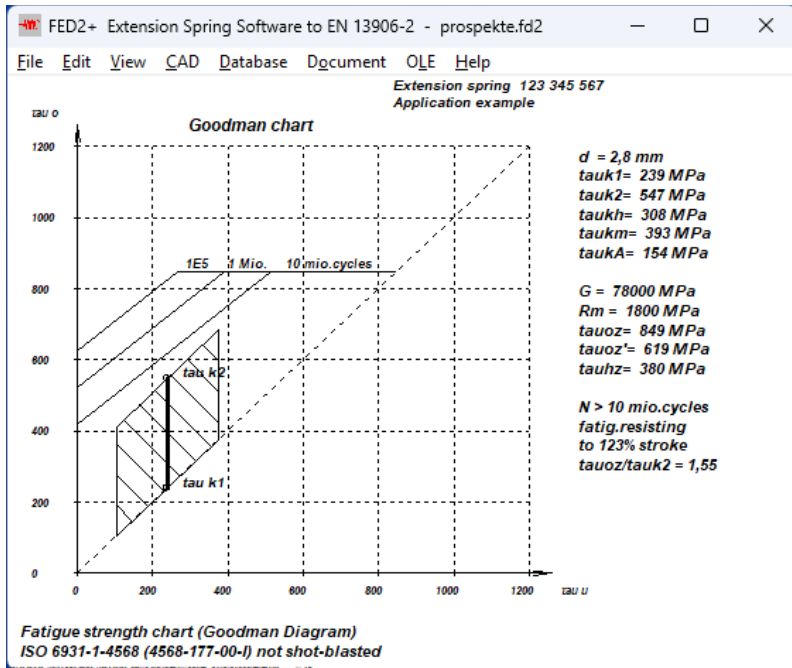
### Tolerances

The program calculates the tolerances for the wire diameter  $d$  according to EN 10218 and EN 10270 (or DIN 2077 for hot-coiled springs), and for  $D_m$ ,  $L_0$ ,  $F_1$ ,  $F_2$ ,  $F_0$ , loop overhang and loop angle according to DIN 2097 and DIN 2096.

### Spring Characteristic Curve

The load-extension diagram for the extension spring can be displayed on screen, alternatively together with the tolerance curves of the DIN 2097 quality grades.





## Goodman Diagram

The operating zone of the selected material for the calculated extension 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

Quick View shows drawings and diagrams together with spring data all together on one screen page.

## Spring Drawing

You can display spring drawings for any clamping length between  $L_0$  and  $L_c$  on screen, or export to CAD via the DXF or IGES interface.

## Animation

FED2+ animation simulates the motion of the spring between two specified positions on screen.

## Production Drawing

FED2+ generates a complete production drawing from the calculated data (in accordance with DIN 2099), ready to be printed, or as DXF/IGES file for CAD.

An international production drawing can be printed in English, German, French, Italian, Spanish, Swedish and Dutch language.

## Spoilage Calculation

The program calculates the spoilage quota for all quality grades and tolerances based on normal (Gaussian) distribution when you provide manufacturing conditions (e.g. 1% spoilage with quality grade 1).

## Spring Database

FED2+ contains a database with spring manufacturer catalogues, which you can replace or append with your own stock springs. After a spring calculation you can search the database for appropriate extension springs by input of minimum and maximum values.

## Price Calculation

FED2+ calculates the price for the manufactured spring, the basic data is stored in the database and can be modified.

## Hardware and Software Requirements

FED2+ is available as 32-bit app or 64-bit app for Windows 11, Windows 10, Windows 8.

## Scope of Delivery

Program with database files, application examples, user manual (pdf), declaration of conformity, license contract for unlimited time use with update rights.

## Software Maintenance

FED2+ 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.

