

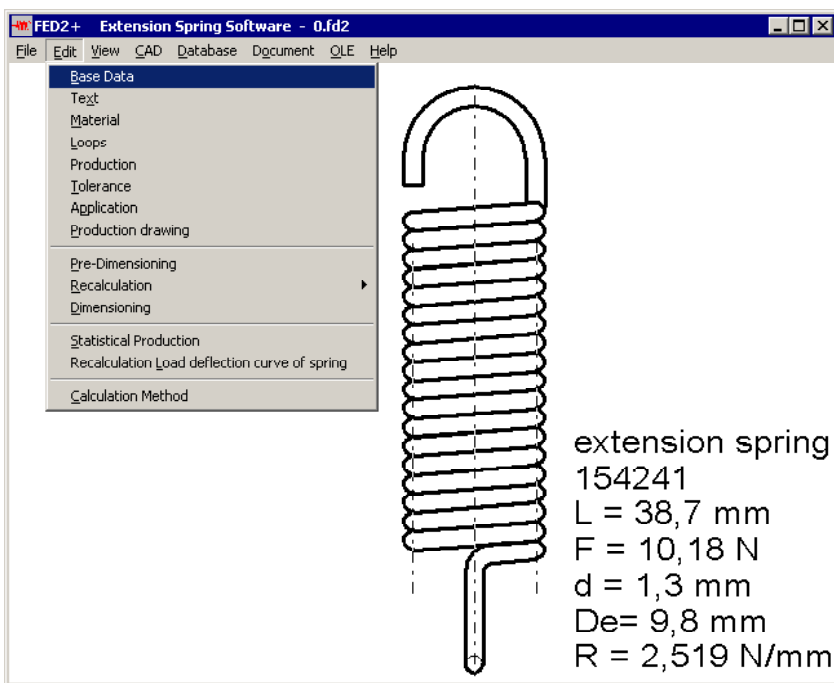
FED2+



www.hexagon.de

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).

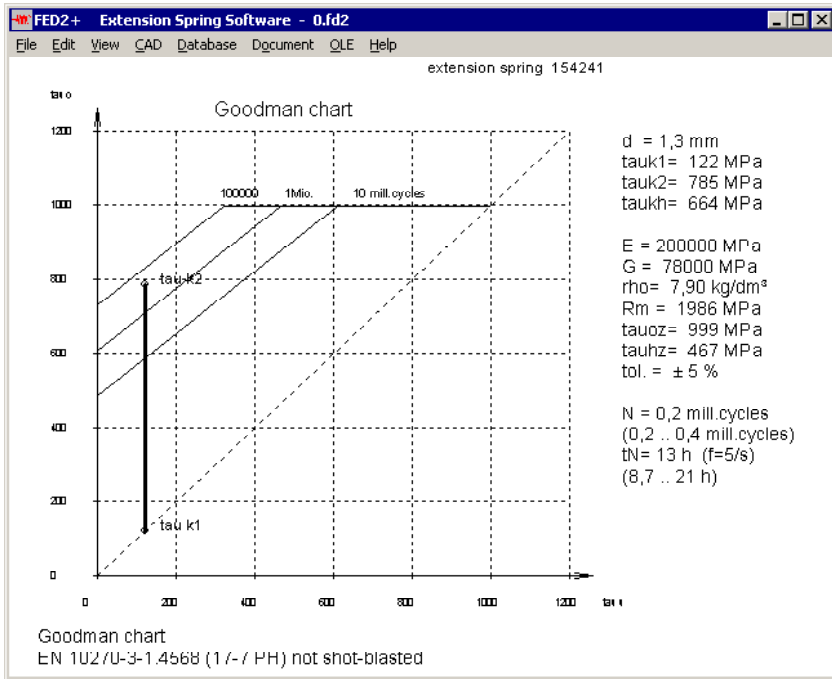
Tolerances

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.

NAME1	NAME2	NAME3	NAME4	G	E
EN 10270-1-SL	spring steel wire pat. drawn	ISO 8458-2-SL	DIN 17223-1 Type A	82000	2C
EN 10270-1-SM	spring steel wire pat. drawn	ISO 8458-2-SM	standard spring wire	82000	2C
EN 10270-1-SH	spring steel wire pat. drawn	ISO 8458-2-SH	music wire	82000	2C
EN 10270-1-DH	spring steel wire pat. drawn	ISO 8458-2-DH	piano wire high-tens	82000	2C
EN 10270-2-FDC	oilhardened spring steel	DIN 17223-2 FD		79500	2C
EN 10270-2-VDC	oilhardened valve spring steel	EN 10270-2 TDC	Oteva31, Becrosi30	80000	2C
EN 10270-2-FDCV	oilhardened spring steel	DIN 17223-2 FD-CV		79500	2C
EN 10270-2-FDCr	oilhardened spring steel	DIN 17223-2 FD-SiCr	Stato70, Becrosi16	79500	2C
EN 10270-2-VDCr	oilhardened valve spring steel	EN 10270-2 TDCr	Uteva80, Becrosi33	79000	2L
EN 10270-2-VDCr7	oilhardened valve spring steel	EN 10270-2 TDCr7	Oteva70, Becrosi36	79000	2C
EN 10089-38Si7	hot-rolled spring steel wire	DIN 17221 38Si7	1.5023	78500	2C
EN 10089-54SiCr6	hot-rolled spring steel wire	DIN 17221 54SiCr6	1.7102	78500	2C
CN 10009-61SiCr7	hot-rolled spring steel wire	DIN 17221 60SiCr7	1.7100	70500	2C
EN 10089-55Cr3	hot-rolled spring steel wire	DIN 17221 55Cr3	1.7176	78500	2C
EN 10089-51CrV4	hot-rolled spring steel wire	DIN 17221 50CrV4	1.8159	78500	2C
EN 10089-52CrMoV4	hot-rolled spring steel wire	DIN 17221 51CrMoV4	1.7701	78500	2C
FN 10089-61SiCrV7	hot-rolled spring steel wire		1.8153	79500	2C
EN 10270-3-1.4310-N5	X10CrNi18-8	18-8. 302. 304	annealed	73000	1E
EN 10270-3-1.4568	X7CrNiAl17-7	17-7 PH	age-hardened	78000	2C
EN 10270-3-1.4401	X5CrNiMo17-12-2	AISI 316	annealed	71000	1E
EN 12166-CuSn6-R900	Cw452K-R900	DIN 17682 2.1020.39		42000	11
EN 12166-CuZn36-R700	Cw507L-R700	DIN 17682 2.0335.39		39000	11



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 L0 and Lc 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.

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 7, Windows 8, Windows 10.

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.

