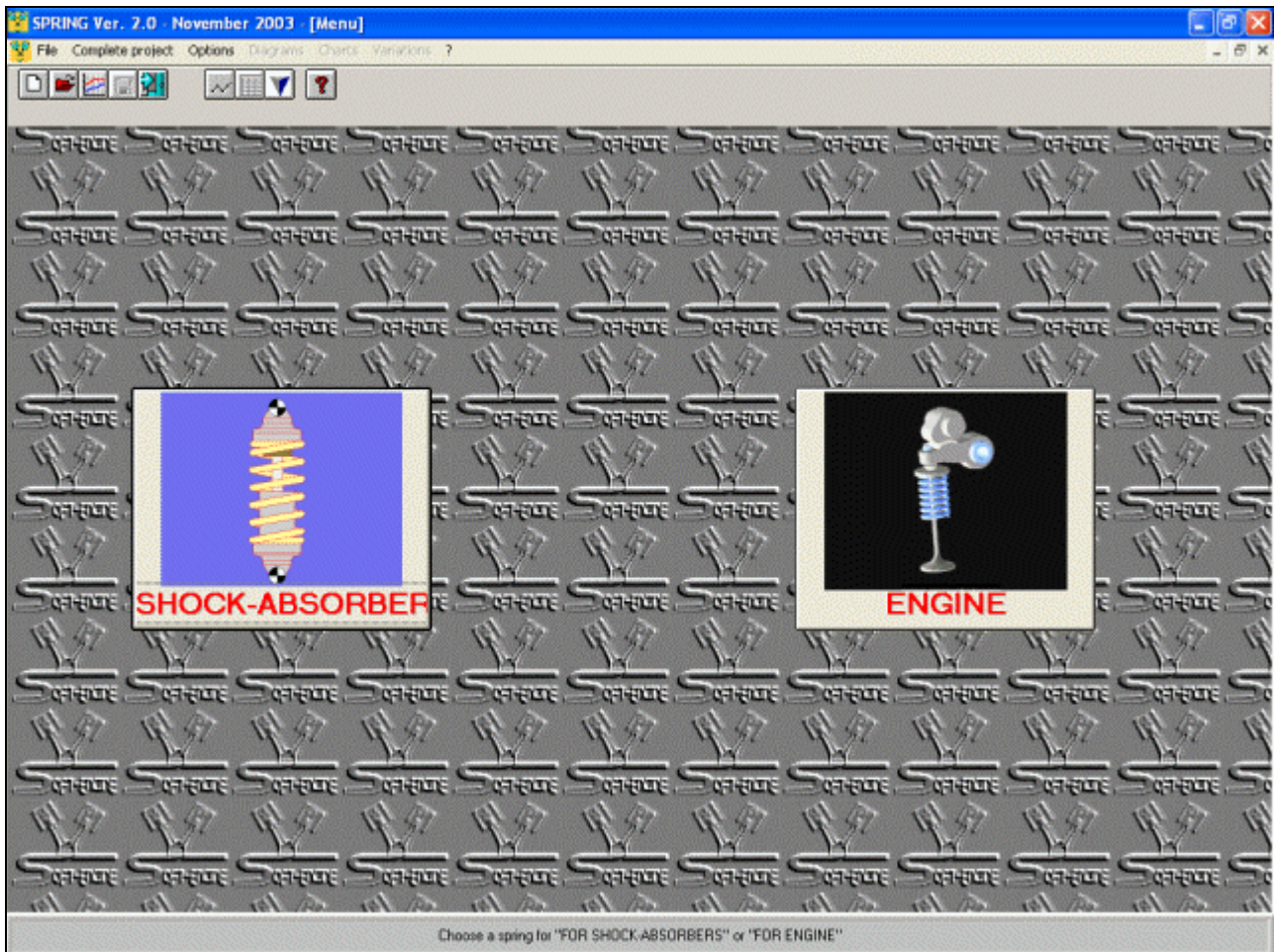


Soft-Engine - Software Spring 2.0

Main features

SPRING 2.0 is a very professional **software** by **Soft-Engine**, WINDOWS® environment, having a friendly graphic interface.

This software is about the project and analysis both **shock-absorbers** and **valves springs**. Obviously, for valve springs it's possible to choice **single spring** or **double spring** computing.

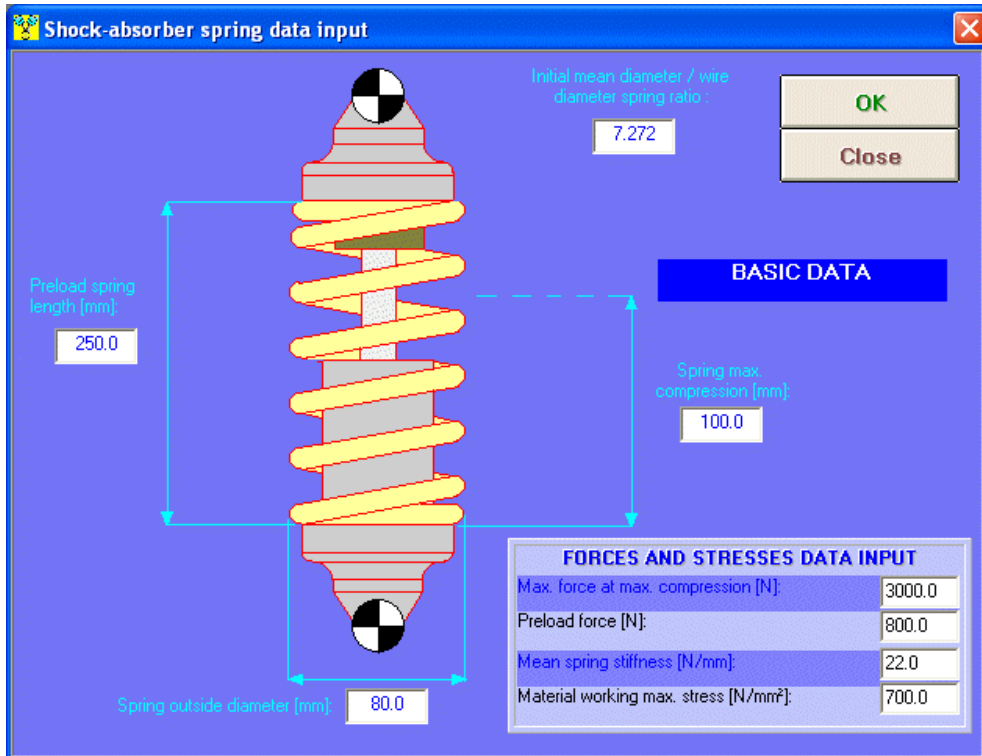


The main window

Data input

Typically, software data input are:

- ☞ **Free spring lenght**
- ☞ **Max. compression force**
- ☞ **Pre-loaded spring froce** (shock-absorber)
- ☞ **Stress** (closed valve, for engine valves)
- ☞ **Stress** (of work material, for shock-absorbers).



Shock-absorber spring data input

Initial mean diameter / wire diameter spring ratio : 7.272

Preload spring length [mm]: 250.0

Spring outside diameter [mm]: 80.0

Spring max. compression [mm]: 100.0

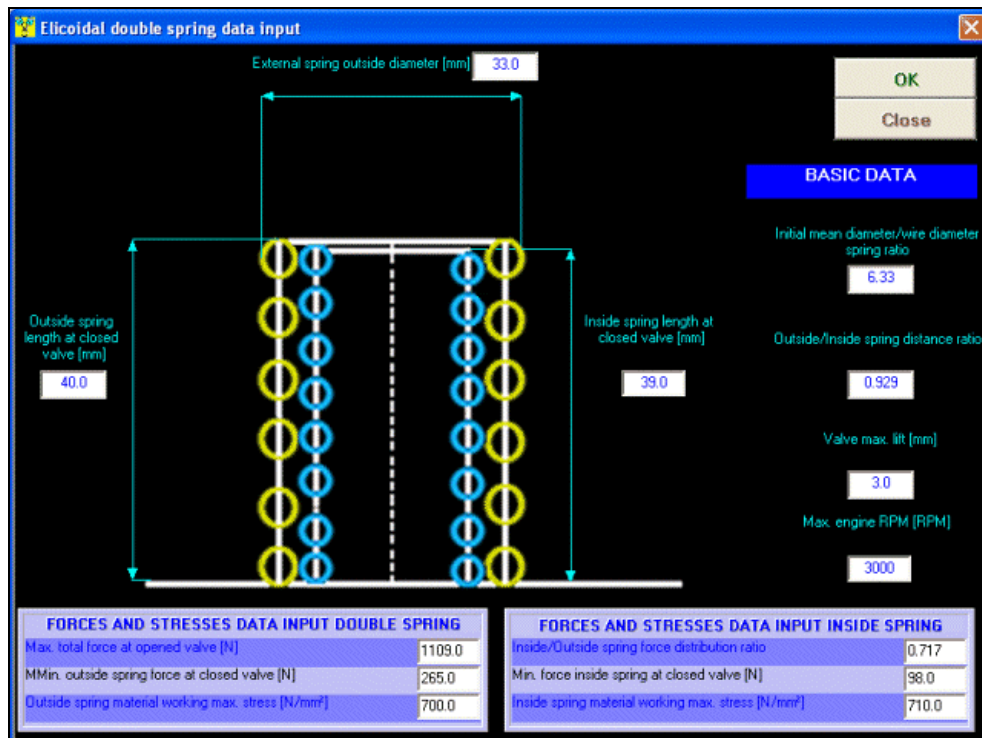
BASIC DATA

FORCES AND STRESSES DATA INPUT

| | |
|---------------------------------------|--------|
| Max. force at max. compression [N]: | 3000.0 |
| Preload force [N]: | 800.0 |
| Mean spring stiffness [N/mm]: | 22.0 |
| Material working max. stress [N/mm²]: | 700.0 |

OK Close

Data input window (shock-absorbers spring)



Elicoidal double spring data input

External spring outside diameter [mm]: 33.0

Outside spring length at closed valve [mm]: 40.0

Inside spring length at closed valve [mm]: 39.0

Initial mean diameter/wire diameter spring ratio : 6.33

Outside/inside spring distance ratio : 0.929

Valve max. lift [mm]: 3.0

Max. engine RPM [RPM]: 3000

BASIC DATA

FORCES AND STRESSES DATA INPUT DOUBLE SPRING

| | |
|---|--------|
| Max. total force at opened valve [N] | 1109.0 |
| MMin. outside spring force at closed valve [N] | 265.0 |
| Outside spring material working max. stress [N/mm²] | 700.0 |

FORCES AND STRESSES DATA INPUT INSIDE SPRING

| | |
|--|-------|
| Inside/Outside spring force distribution ratio | 0.717 |
| Min. force inside spring at closed valve [N] | 98.0 |
| Inside spring material working max. stress [N/mm²] | 710.0 |

OK Close

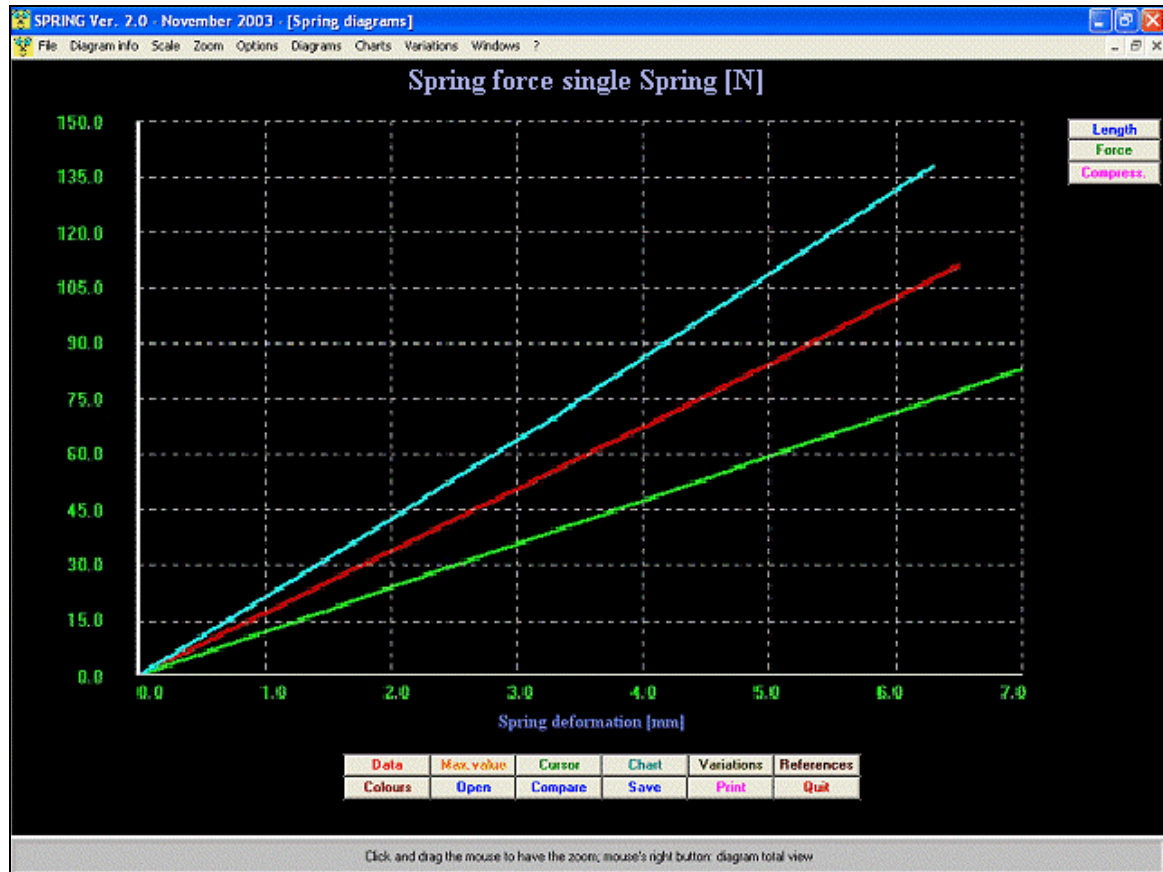
Data input window (engine spring)

Results

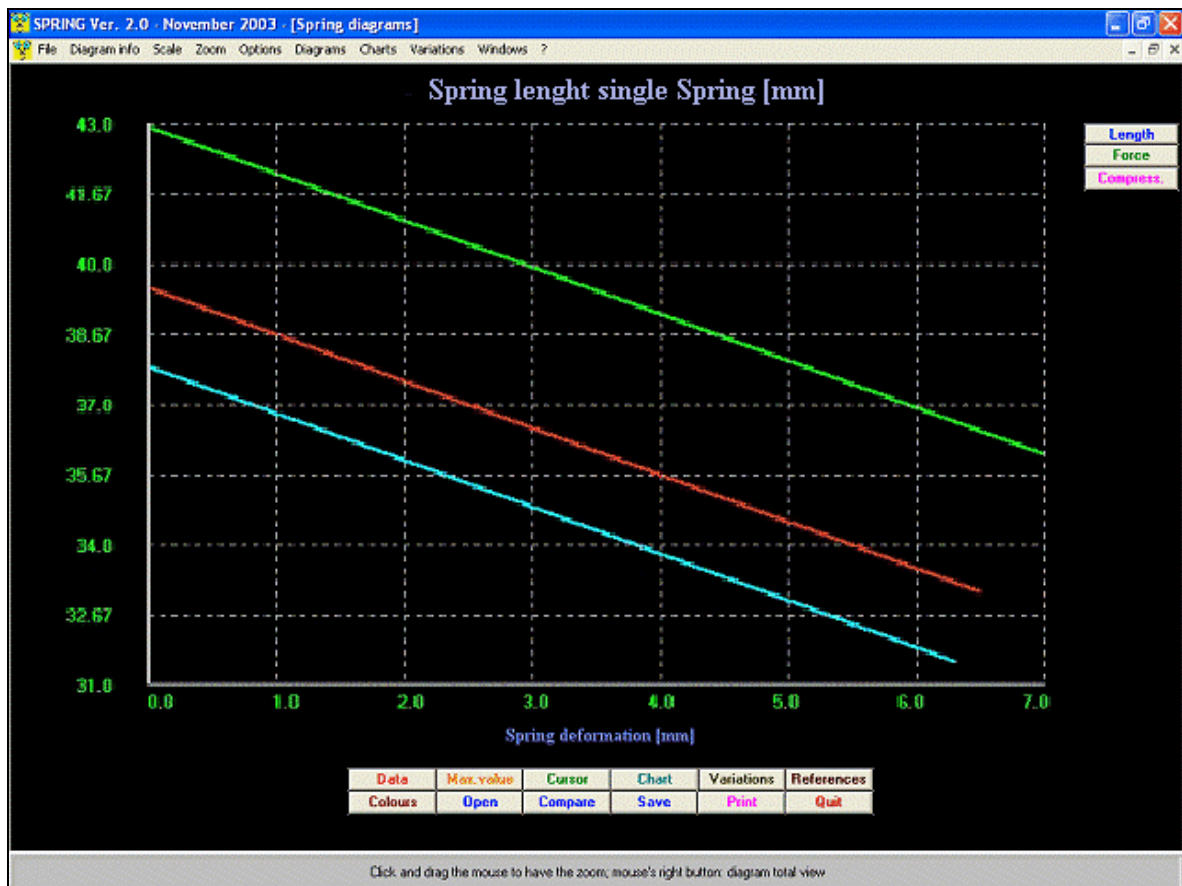
Software give some diagrams and charts about these results:

- ☞ Spring lenght
- ☞ Spring force
- ☞ Valve lift (for engine springs)
- ☞ Spring compression (For shock absorbers).

Soft-Engine engine simulation software – software “Spring”



Single spring force diagram



Single spring length diagram

Results analysis

Suitable query reports show some interest data, like **block forces and stresses**, **Whal factor**, **number of coils** or **harmonics of excitation**. You can vary input data in these query reports to study how projected spring change its features (option: variations). The input data modifications can be saved in another "data configuration", so you can compare the results about different swet of data, corresponding to different springs.

SPRING 2.0 has got a powerful form for diagram visualization. Options are:

- ☞ **diagram cursor** to read all diagram value step by step;
- ☞ **max values** visualization
- ☞ **zoom**
- ☞ **printings**
- ☞ all software options are available by this form
- ☞ diagram and backgrounds management
- ☞ X and Y axis management

Finally, this software allows a complete save-open file management, and a **link** with the most recent versions of software [SUSPENSION](#) and [CAMS](#).

Double spring results query chart

Configuration: Basic data

| BASIC DATA | |
|---|--------|
| Outside/Inside spring distance ratio: | 0.929 |
| Valve max. lift [mm]: | 3.0 |
| Max. engine RPM [RPM]: | 3000 |
| Max. total force at opened valve [N]: | 1109.0 |
| Inside/Outside spring force distribution ratio: | 0.717 |

| OUTSIDE SPRING | |
|--|-------|
| External spring outside diameter [mm]: | 33.0 |
| Initial mean diameter/wire diameter spring ratio [mm]: | 6.33 |
| Outside spring length at closed valve [mm]: | 40.0 |
| MMin. outside spring force at closed valve: | 265.0 |
| Outside spring material working max. stress [N/mm²]: | 700.0 |

| INSIDE SPRING | |
|---|-------|
| Inside spring length at closed valve [mm]: | 39.0 |
| Min. force inside spring at closed valve [N]: | 98.0 |
| Inside spring material working max. stress [N/mm²]: | 710.0 |

Buttons: Watch, Basic data restore, New configuration

| BASIC DATA RESULTS | |
|--|----------|
| FMin/FMax spring ratio: | 0.333 |
| Spring frequency obsccillation [Cycles/m]: | 127160.2 |
| Harmonics excitation spring: | 40.0 |
| Spring frequency / cams shaft frequency ratio: | 84.773 |

| OUTS. SPRING DIMENSIONS AND FEATURES | |
|---|---------|
| Spring mean diameter [mm]: | 28.32 |
| Spring wire diameter [mm]: | 4.68 |
| Mean diameter / wire diameter spring final ratio: | 6.053 |
| Free length [mm]: | 41.32 |
| Length at opened valve [mm]: | 37.0 |
| Block length [mm]: | 12.87 |
| Used turns number: | 1.0 |
| Total turns number: | 2.75 |
| Distance between turns [mm]: | 24.13 |
| Max. force at opened valve [N] | 795.15 |
| Block force [N]: | 5284.46 |
| Stress at closed valve [N/mm²]: | 233.27 |
| Stress at opened valve [N/mm²]: | 699.93 |
| Block stress [N/mm²]: | 4651.62 |
| Mean spring flexibility [mm/N]: | 0.0057 |
| Mean spring stiffness [N/mm]: | 176.72 |
| Spring's Wahl factors: | 1.25 |

Buttons: Inside spring, Print, Close

Results query chart

Soft-Engine engine simulation software – software “Spring”

Versions and costs

| Version | Cost |
|--------------|---------|
| Spring 2.0 W | € 95.00 |

PC minimum configuration

| Feature | Description |
|--|---|
| Processor: | Any personal computer IBM compatible. |
| System: | Windows ME, NT, Xp, Vista, Seven, Eight, Ten - 32 or 64 bit systems. |
| Memory RAM and Hard Disk: | At least 512 MB RAM and 2 GB free in the hard disk (for best Windows performances). |
| CDrom or Dvdrom device: | Speed at least 52X. |
| Graphic card: | VGA, SVGA and compatible cards, set at least 32 bit, Min. resolution: 1024x768. |
| Miscellaneous: | Keyboard, mouse, at least 1 USB port free (to connect the printer). |
| Printer: | Any ink-jet printer. Total compatibility with laser printers. |
| Total compatibility with notebooks and cases minitower PC. | |