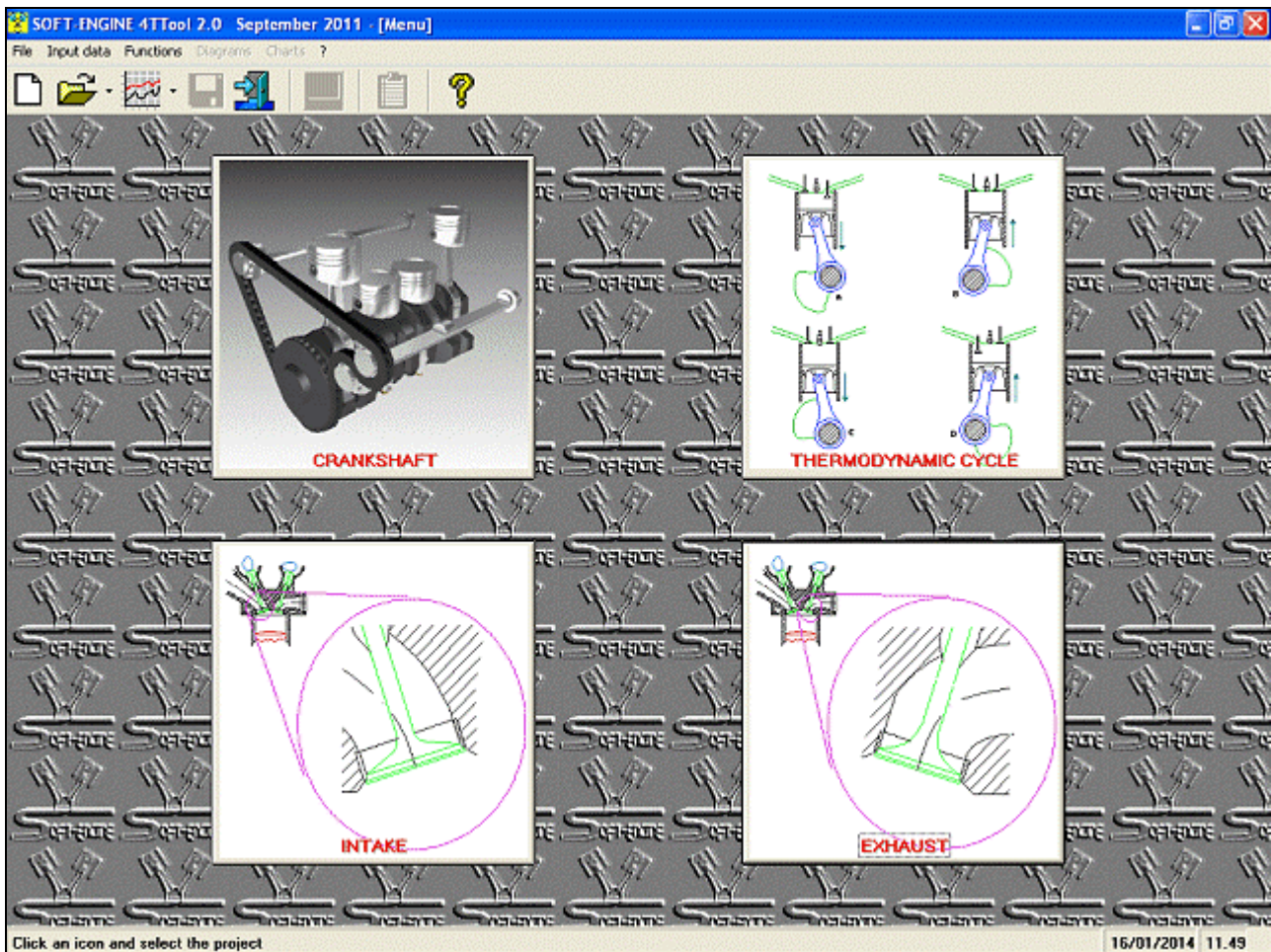


## Soft-Engine - Software 4TTool 2.0

### Main features

**4TTOOL** is a software by **Soft-Engine** for a wide range of applications including everything you may need to develop a 4-stroke engine with a special focus on practical issues. It runs on Windows. Data can be entered by means of drawings.



*The main window*

### Data input

By the main window the right computing model can be selected.

**Crankshaft Data**

Engine data input	
Bore [mm]	54.0
Stroke [mm]	54.0
Con rod length [mm]	110.0
Max. RPM [RPM]	14000.0

Inertial force data input	
Alternate masses [g]	100.0
Area of stressed section [mm <sup>2</sup> ]	100.0

**KINEMATICS**

**INERTIAL F.**

**OK**

**Close**

Input data, OK to confirm... 13/12/2013 17.10

*Crankshaft data input*

**Crankshaft Data**

Engine data input	
Bore [mm]	54.0
Stroke [mm]	54.0
Con rod length [mm]	110.0
Max. RPM [RPM]	14000.0

Thermodynamic cycle data input	
Effective compression ratio	9.0
Volumetric efficiency	0.78
Air / fuel ratio	14.0
Inlet pressure [mBar]	1000.0
Inlet temperature [°C]	15.0
Ignition advance BTDC [°]	20.0
Inlet opening advance BTDC [°]	30.0
Inlet total period [°]	300.0
Exhaust opening advance BBDC [°]	40.0
Exhaust total period [°]	300.0

**Close**

**OK**

Input data, OK to confirm... 13/12/2013 17.10

*Thermo-dynamics data input*

**INTAKE: HELMHOLTZ MODEL, 4 CYLINDER ENGINE**

**Carburettor** Diameter [mm]: 36.2 Length [mm]: 130.0

**secondary pipe** Diameter [mm]: 34.8 Length [mm]: 127.0

**PLENUM/BOX** section [mm<sup>2</sup>]: 2837.0 Length [mm]: 60.8

**primary pipe** Diameter [mm]: 31.6 Length [mm]: 209.6

**cylinder head pipe** Length [mm]: 101.6

Nb. valves: 1 2 3 Valve seat int. diameter [mm]: 28.5

**RESULTS**

Compression ratio: 11.0

Unit capacity [CC]: 149.5

Text ON

Resonance engine RPMs

Nb. valves: 1

N1 [rpm]: 3810

N2 [rpm]: 8955

Print Observe OK Close

LIMITES [10.0; 54.0] mm 13/12/2013 17.10

Intake computing model (Helmholtz) to calculate resonance regimes for single or four cylinders engine. Data input

**EXHAUST: SINGLE CYLINDER ENGINE**

Exhaust gases temperature [°C]: 620.0

Exhaust phase total period [°]: 345.0

Exhaust opening advance BBDC [°]: 85.0

Exhaust pipe length [mm]: 1500.0

**RESULTS**

Text ON

RESONANCE ENGINE RPMs [rpm]

K = 1	8834
K = 2	4417
K = 3	2944
K = 4	2208
K = 5	1766

Sound velocity [m/s]: 600.1

Print Observe OK Close

Input data, click on OBSERVATION to get results 16/12/2013 17.25

Exhaust computing model for single cylinder optimal length and resonance regimes. Data input

## Results

This software calculates the following values:

☞ **crank shaft system** with:

- animation
- inertial forces
- sigma (stress)

☞ **thermodynamic cycle**

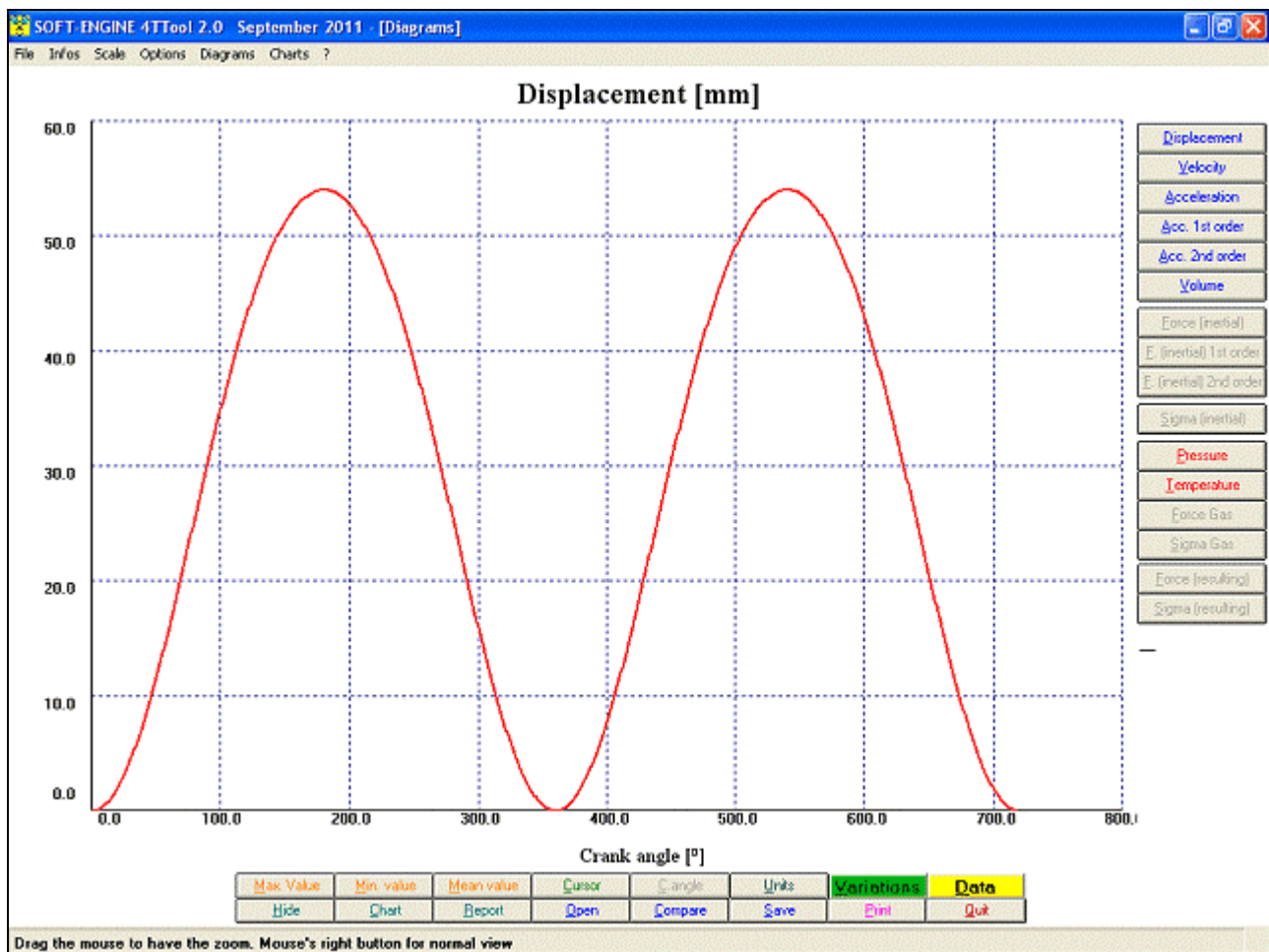
☞ **exhaust** with:

- R.P.M. when engine resonance for single cylinder or individual ducts occurs

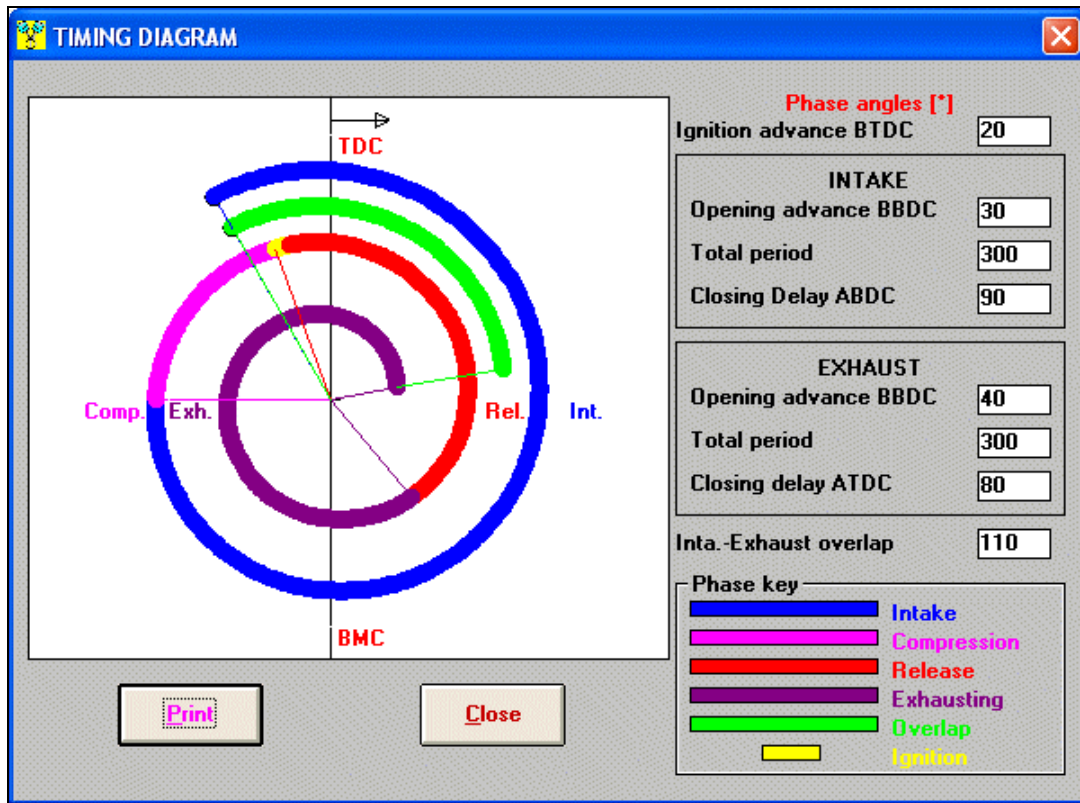
☞ **inlet** according to the Helmholtz model for :

- **single cylinder** or individual ducts
- **4 cylinders engines**

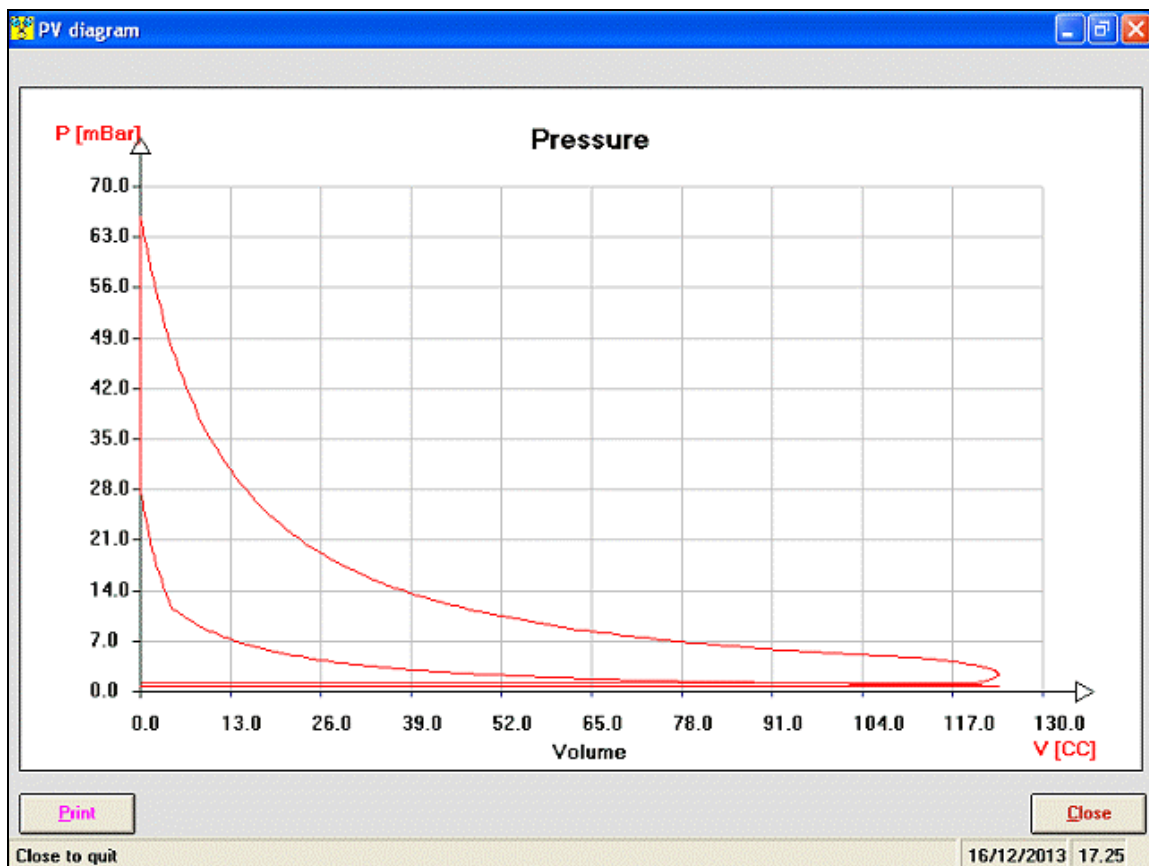
Graphics, charts, file printing, and on-line help utilities.



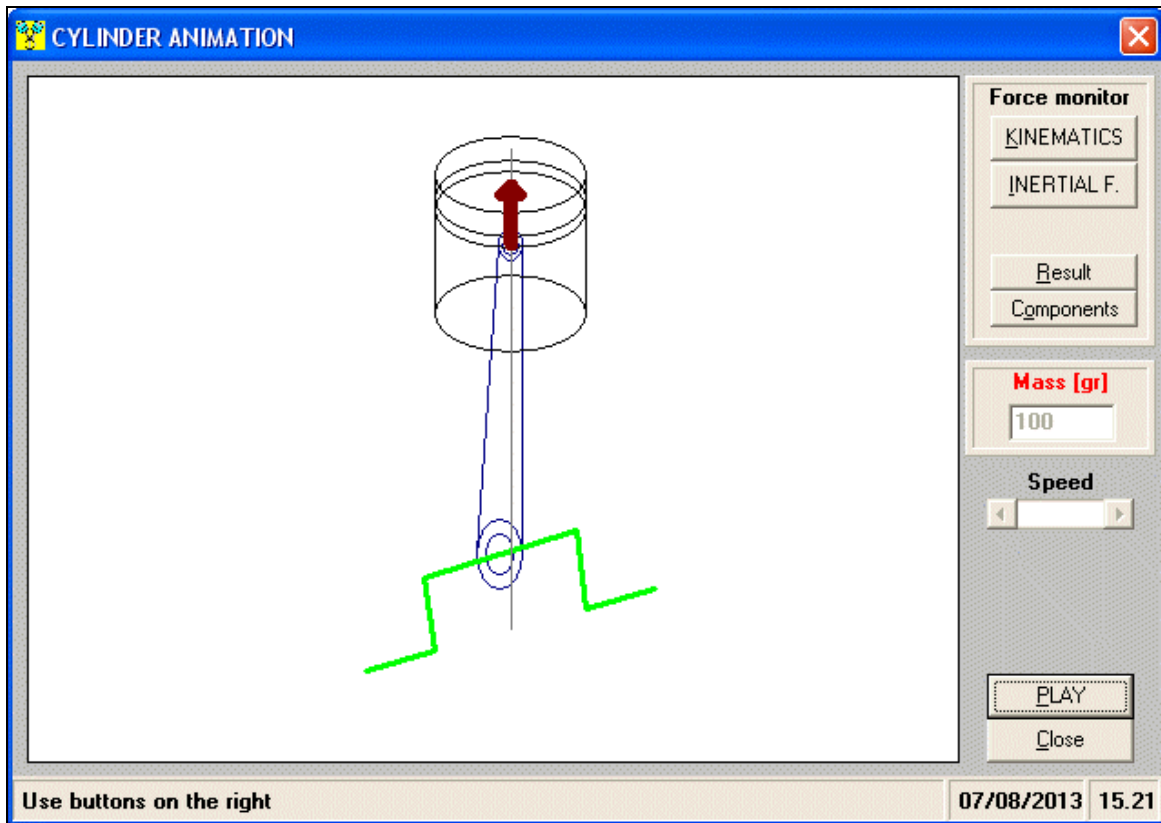
*Crankshaft (dynamics) - piston Displacement diagram*



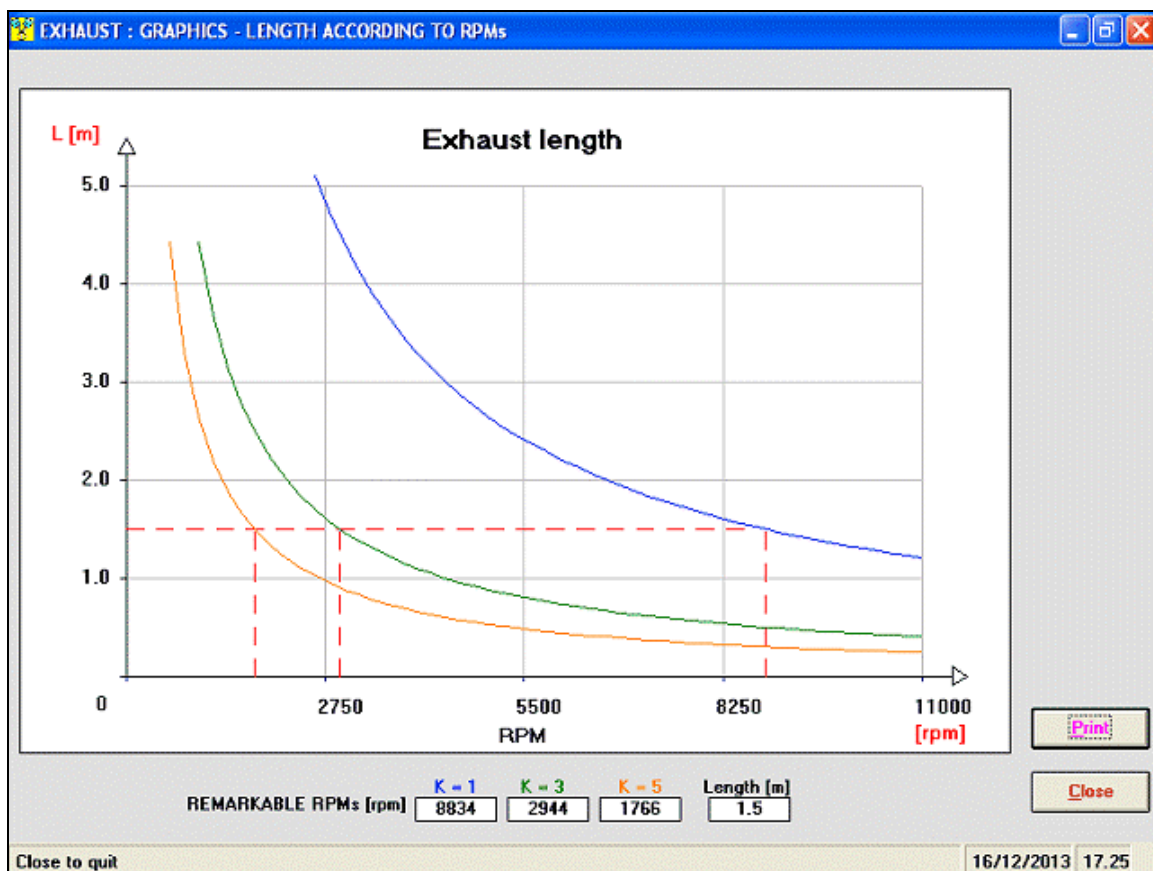
Timing



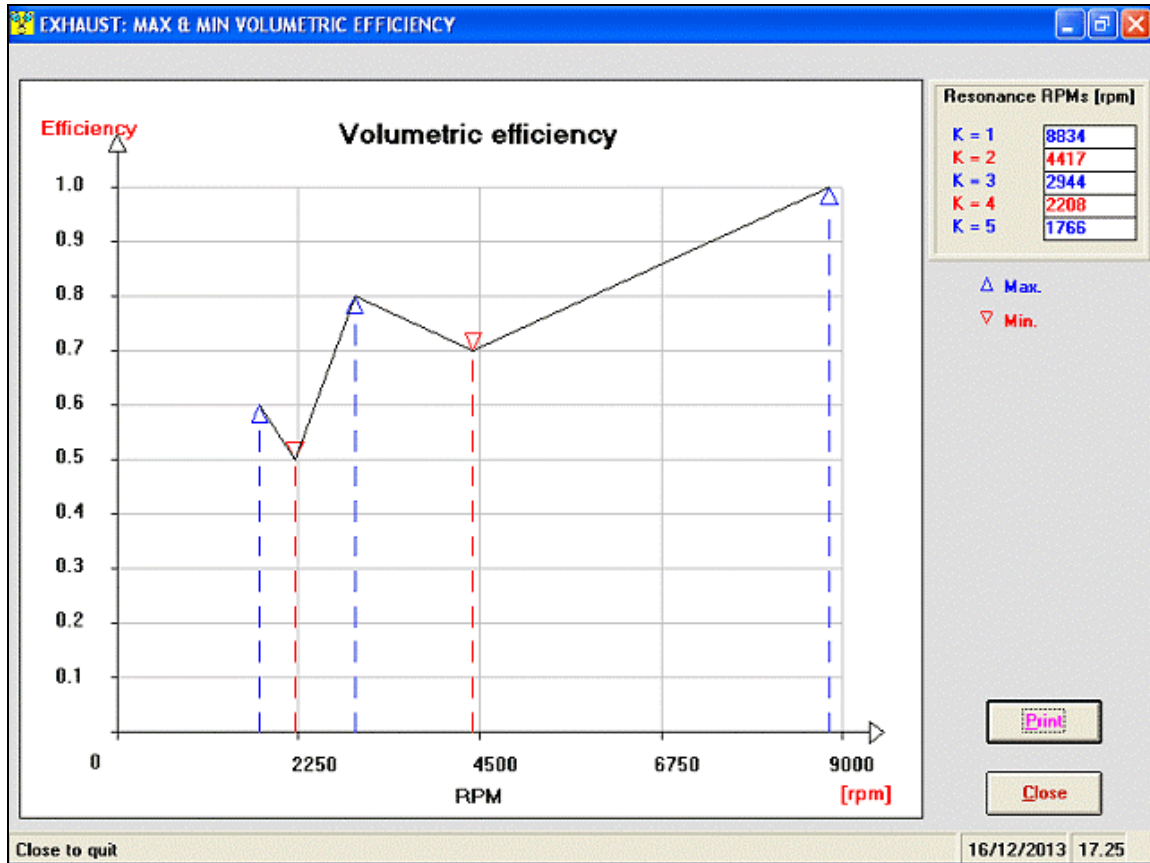
P/V diagram



Animation showing the inertial forces in the piston



Exhaust: optimal length exhaust systems diagram, varying the maximum resonance RPMs



*Exhaust: volumetric efficiency diagram*

### Versions and costs

Version	Cost
4TTool 2.0	€ 110.00

### 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.	