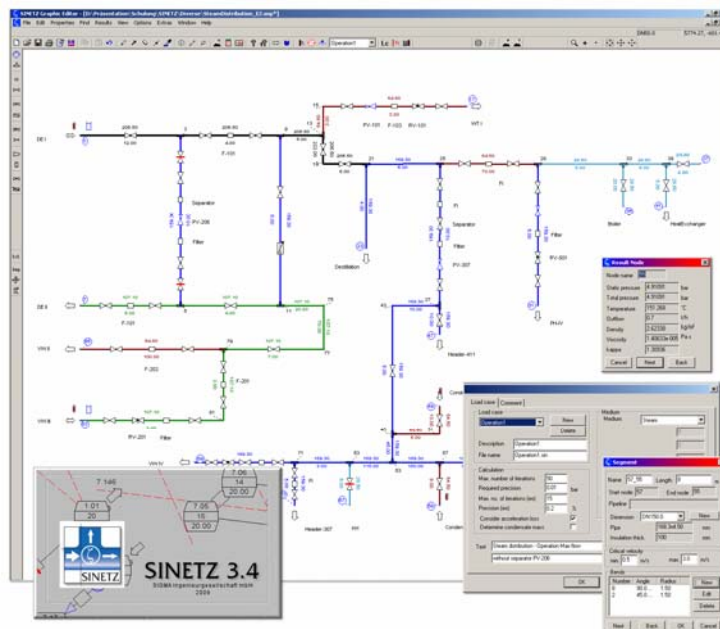


SINETZ

Steady State Calculation of Flow Distribution, Pressure Drop and Heat loss in Branched and Intermeshed Piping Networks

Introduction

Running Demo programs
and
Editing a System



November 2009

SIGMA Ingenieurgesellschaft mbH

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1 Introduction

Thank you for opening this document. It offers an introduction into the working with the program system SINETZ. The description can be used for SINETZ full licenses as well as for the SINETZ demo license.

Users of a full-featured SINETZ license:

please refer to topic 4 of this document for further treatment. Sample calculations are stored in the ../SINETZ/EXAMPLE/... directory after installation of the program.

If you are using the SINETZ demo license please find SINETZ calculation examples on the Demo-CD or in the SINETZ Demo installation.

Please note when creating projects using the demo program:

The projects, created by the demo program cannot be used in the full program licenses.

Projects, created by a full featured SINETZ license only can be displayed in a Demo version (no editing, no storing).

The programs on the Demo CD show the entire range of functions of the graphical user interface (Pre- and Post processing), except of the calculation processor. The analysis and, if requested, a check of your input data may be done by our support team after.

2 SINETZ Demo program

2.1 Start and installation of the demo program

The SINETZ demo program comes on Demo-CD or by Internet download.

To receive a demo program, please contact us by email (sales@rohr2.com), use the contact form on www.rohr2.com or call us by phone.

Start the Program demos

- directly from CD without copying any data to your PC
- from your local PC

License conditions of a demo program

The use of the demo programs is free of charge. Programs are always carried out under the demo software license conditions of SIGMA Ingenieurgesellschaft. Please pay attention to the file *democond_ROHR2_SINETZ.pdf*. The demo conditions are included in the demo-CD, in the attachment of the demo link email or can be downloaded from the internet (www.rohr2.com).

***If you not agree to the license conditions, you are not permitted to carry out the programs.
Remove the programs in this case.***

In case of questions concerning installation or use of the demo programs, please, contact the SIGMA program support.

2.2 Manuals and documents

All program descriptions documents are stored in the Adobe Reader pdf-file format.

The installation of Adobe Reader is required to open the documents. Install Acrobat Reader from the program CD or get the newest version from the internet (www.adobe.com). The use of this program is free.

To be informed in detail about the use of the Adobe Reader see help function of this program.

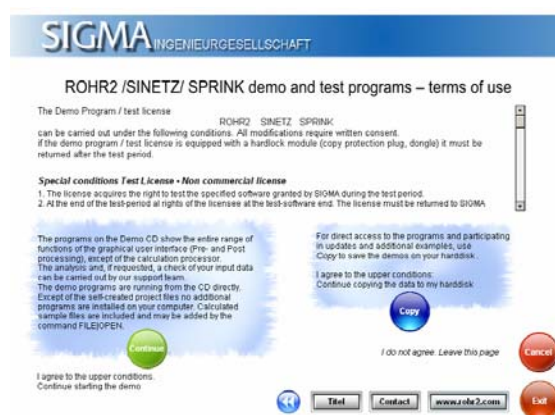


2.3 Running the demo programs

Starting the SINETZ demo program from CD

The ROHR2 demo program is running from CD directly. Calculated sample files are included and may be added by the command FILE|OPEN.

Except of the self-created project files no additional programs are installed on your computer.



Copy the demo program to your PC and use the update function

Copy the ROHR2 and SINETZ demo programs to your local harddisk. Select the program to be copied in the dialog window.

After installation of the programs on your local system an integrated update function enables to download program updates and additional example projects. A connection to the internet is required.

3 Program abstract

SINETZ is a program for the calculation of pressure and temperature loss in branched and intermeshed piping networks with circular, rectangular as well as any cross sections, defined by the hydraulic diameter.

SINETZ calculates direction of flow, rate of flow and temperature loss for individual pipe sections, as well as the temperature and pressure of individual nodes, and the resulting flow distribution for an intermeshed system of any complexity.

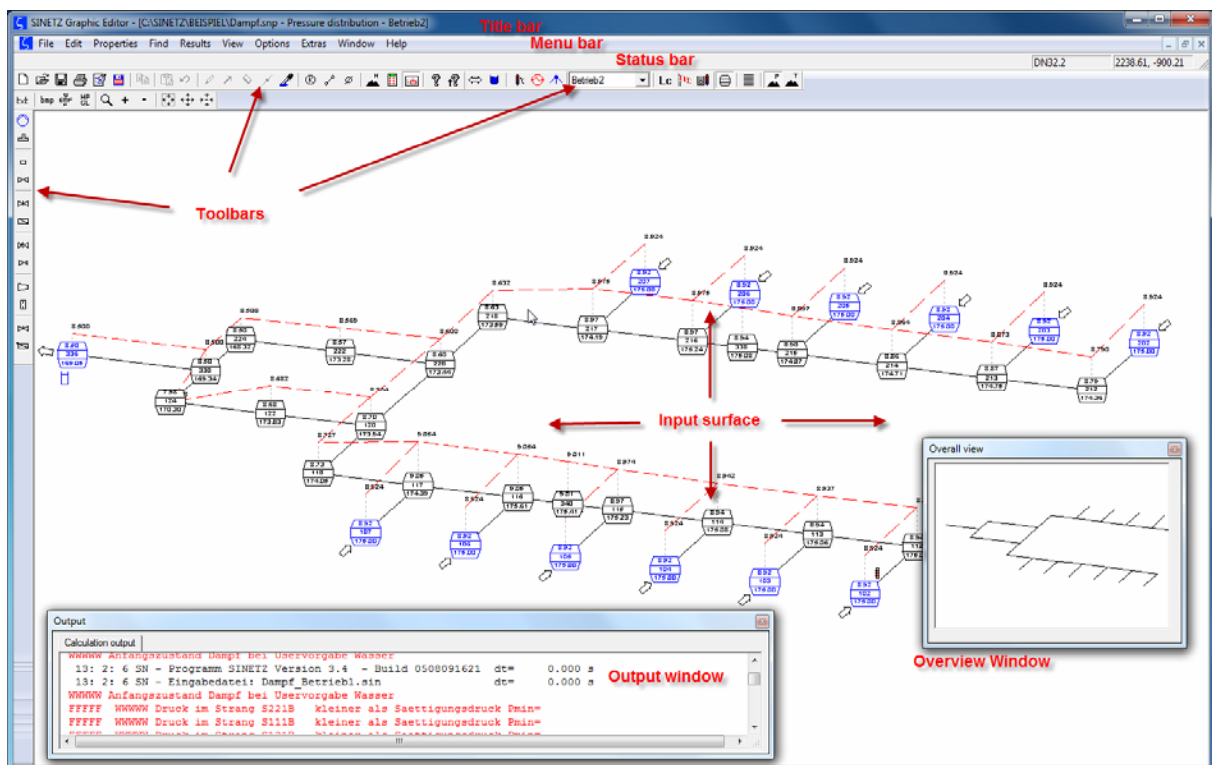
Calculations for compressible and incompressible media are both possible.

The calculation is carried out for a given system assuming a steady state flow. A graphical representation of the network plan (plot), with the results included therein, is displayed on screen, or produced at a printer or plotter.

4 Editing a System

4.1 The SINETZ graphical user interface - Overview

The input window shows the piping system and the drawing created. All program functions are accessible by menu commands and symbols (icons). The title bar shows the name of the current project including complete path. The status bar represents the currently used program command and the selected system data. All elements of the user interface may be placed free on the screen. The textual calculation output is shown in the output window.



4.2 Starting the program

Start SINETZ by selecting the program icon.

Create a new project or load an existing file by using *File| New*, or *File| Open*.

All inputs are made by a keyboard and standard mouse. Additionally SINETZ supports inputs by the separate numeric keypad of the standard keyboard and the mouse wheel.

The piping and all boundary conditions are entered via the graphical user interface.

On this parameter basis the program creates an ASCII input file from where the calculations are made. The input file can also be edited with an ASCII editor.



4.3 Settings

At first, in the menu *Options| Settings* general settings are made. The dialog window *Settings* is shown automatically when a new system is opened.

Select the pressure and mass units. The automatic determination of zeta-values at branches can be switched off. Define norm and soil cover if there are insulations of buried pipes.

Put in an order name, a page header and the number of lines per page and chose a language for your printer output of results.

The graphic is printed in the same language as well.

Got to the Graphic index to control the graphic parameters as paper size, scale, grid and settings of text representation and colors. An isometric grid may be activated.

The screenshot shows the 'Settings' dialog window with the 'General' tab selected. The 'Commission' field contains '091112_comm3'. The 'Units' section has radio buttons for 'kg/s', 't/h', 'Nm²/h', 'bar', and 'mbar', with 'bar' selected. The 'Presettings' section includes a text field for 'Average' (0.06 mm), a dropdown menu for 'nahtlose Stahlrohre, neu (max)', and checkboxes for 'Determine branches automatically' (checked) and 'Iteration of regulating valves: use zeta value of the last calculation for the first step' (unchecked). The 'Output file' section has radio buttons for 'German' and 'English' (selected), an 'Echoprint' checkbox (unchecked), and a text field for 'Lines/page in output file' (70). The 'Project' section has two text fields: 'Pressure loss Heat loss calculation' and 'Cooler002'.

Define load cases in the dialog window *Load Cases*. The definition of load cases enables to analyze different operation states in one system. Boundary conditions (pressure, temperature, quantity injection, ...) are given to each load case separately. Depending on load cases the zeta-values of components (valves, shutter, ...) can be put in as well as pumps may be switched on and off. For each load case a medium as well as the precision grade and the maximum number of iterations may be defined.

If a new system is created, the dialog window load case is shown automatically.

The menu *Edit -Pipe dimensions* is used to define the dimensions and insulation. The Dialog window pipe dimensions are shown automatically in a new system.

To distinguish several dimensions, they may be assigned to various pen width and colors. If heat loss has to be calculated, it is required to enter insulation parameters.

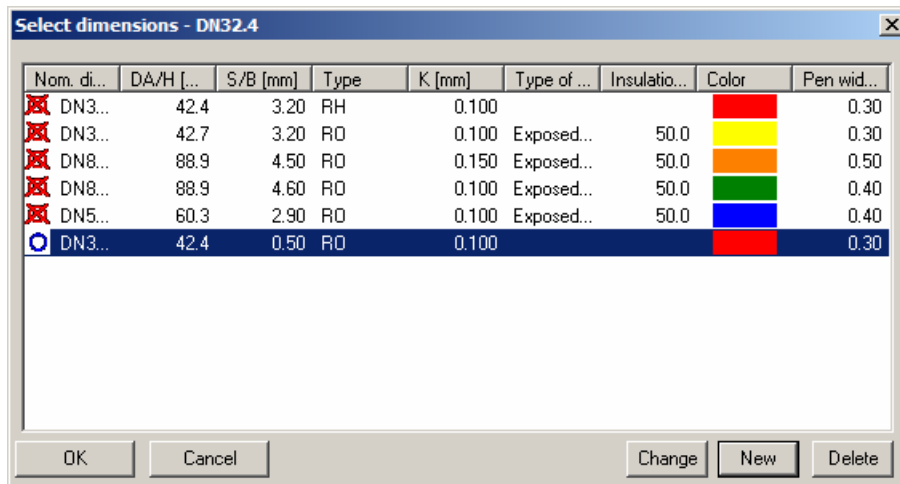
The pipe dimension parameters used in the system are stored.

The selected pipe dimension always is shown in the status bar.

4.4 Geometry input

The system has to be divided into pipe sections. A pipe section consists of a pipe segment with a constant diameter without branches. Create the pipe system by means of *Edit-Draw*.

The input of the piping system is unscaled. Due to the given scale (see above, settings) the section length are calculated by the program. They may be altered by the user in *Properties | pipe section*. All pipe dimensions, shown in the status bar, are assigned to the pipe sections. If dimensions change, they must be edited in *Edit-dimensions*



Change the dimensions of pipes as follows:

- select desired pipe sections.
- Use *Edit|Pipe dimensions* to choose the pipe dimensions.

If there are height parameters at nodes, they may be entered in *Properties - nodes*. If nodes have been selected before, the indicated heights are assigned to them. Use *Show node heights* to get a perspective representation of the heights

Bends are inserted by the command *Properties-section*.

Use the *copy* command to extend the piping system with symmetric partial systems. Given parameters of nodes and sections, e.g. dimensions and boundary conditions remain.

Change the position of nodes by *edit -move*. If parts of the system are selected (highlighted), the nodes at all selected pipe sections are moved.

4.5 Components

Assign additional resistors and pressure loss parameters to pipe sections by *Edit -Components*. If there are more than one defined load cases, zeta values and Pressure loss parameters of the components may be indicated depending on load cases. This may be useful for the representation of different operation states with open and closed instruments.

Insert reducers at nodes where dimensions change.



4.5.1 Boundary conditions

For each load case boundary conditions like pressure, quantity injection, Heat exchanger and temperature have to be indicated in the system. Required is a minimum of one temperature value, pressure parameter and quantity injection. Each inflow and outflow needs one quantity injection / volume flow.

At in- and outputs with unknown flow volume a quantity injection = 0 must be entered. The actual quantities are calculated by the program then.

At least one node with quantity injection = 0 for each load case must be entered.

If pressure and quantity are defined at a input or output (quantity < 0), at other in- and outputs neither pressure nor quantity are allowed.

4.5.2 Calculation and results

The SINETZ calculation starts by the command *File-Calculate*. If there are several defined load cases, the dialog window *Select Load Case* appears where the load cases to be calculated can be highlighted. Show the results of the analysis by means of *Results | Output file* or graphically by the command *Results | Show results*. Additionally it is possible to show a perspective representation by *Results | Show pressure distribution and temperature distribution*

The results of the load case highlighted in the toolbar load case are shown

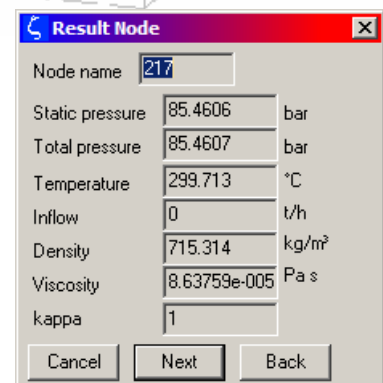
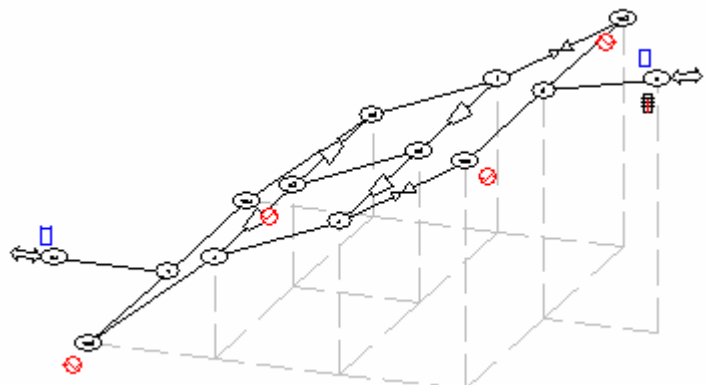
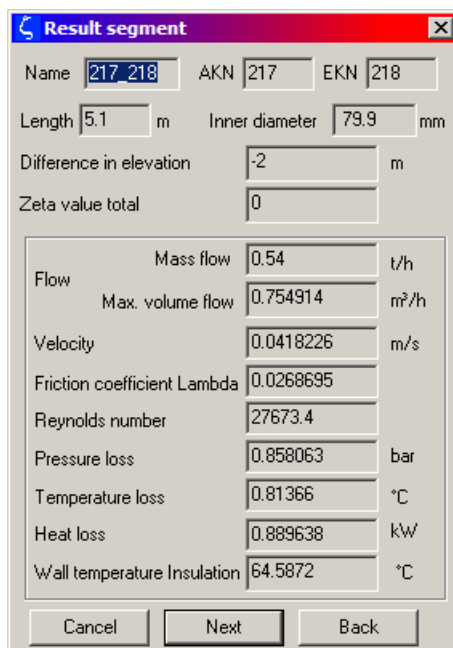


4.5.3 Output of results

Output of the results on a printer by means of *file-print/print*.

The output file is printed when the output-file window is active. Otherwise the graphic is printed.

Store (export) the graphical representation by *File-Export* in HPGL- or DXF-file format.



4.6 User support

All software commands are documented in the printed user manual and in the program online help, see *Program documentation*, **Fehler! Verweisquelle konnte nicht gefunden werden..**

Advice about installation and application of the program (hotline-service) on workdays (Mondays to Fridays) from 9.00 - 16.00 (CET).

An email function, integrated in to SINETZ enables to transmit program data directly.

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