

Software for the Hydraulic Calculation of Sprinkler Systems

Successfully IDAT GmbH has designed for more than 15 years software for sprinkler systems. WinSprink was developed for the hydraulic calculation of area fire sprinklers and the program SprCAD for the design and calculation of these systems under AutoCAD.

WinSprink

Basis for WinSprink is the experienced calculation core. Tree and loop typed systems can be calculated.

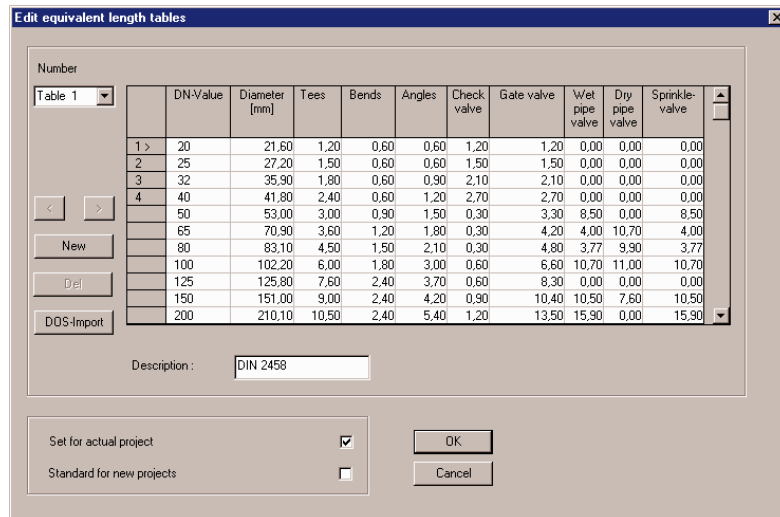
The input of data is made by an input tree view control which can be compared with the Windows-Explorer. The item which should be processed can be selected directly from the tree (e.g. range pipe). The data of this item will be shown on the right hand side in a table. Thus, finding the items and changing them is easy and fast.

The screenshot shows the WinSprink software interface. On the left is a tree view of a project named 'Project 1'. The tree includes folders for 'Project datas', 'Ceiling-/rack protection', 'Working method', 'Sprinkler', 'Range pipes', 'Fall- and risepipes', 'Distribution pipes', 'Main distribution pipes', 'Supply pipes', and 'Print pages'. Under 'Range pipes', there are nine sub-items labeled 'Range pipe_1' through 'Range pipe_9'. Under 'Distribution pipes', there are five sub-items labeled 'Distribution pipe_1' through 'Distribution pipe_5'. The main window displays the 'Input of subpipes' section. It includes input fields for 'Pipe' (R4), 'C-factor' (120), and 'Beginning node' (V1), along with a 'Copy' button. To the right, there are two boxes: 'Symbol for special types' and 'Symbol for nodes'. The 'Symbol for special types' box contains: B : Bends, T : Tees, W : Elbow, K : Gate valve, S : Check, V : Valve. The 'Symbol for nodes' box contains: S : Sprinkler, R : Range pipe, F : Fall- and, V : Distribution pipes, H : Main distribution, Z : Supply pipes, E : End. Below these is a table with 10 columns: Operation area, Length [m], Difference of height [m], DN-Value, Amount of bends, Amount of tees, Amount of Elbows, Special length [m], Special typ, and Ending node. The table contains 7 rows of data.

	Operation area	Length [m]	Difference of height [m]	DN-Value	Amount of bends	Amount of tees	Amount of Elbows	Special length [m]	Special typ	Ending node
1 >	1	3,00	0,00	32	0	1	0	0,00		S1
2	1	3,00	0,00	32	0	0	0	0,00		S1
3	1	3,00	0,00	32	0	0	0	0,00		S1
4	1	3,00	0,00	32	0	0	0	0,00		S1
5	1	3,00	0,00	32	0	0	0	0,00		S1
6	1	3,00	0,00	32	0	0	0	0,00		S1
7	1	3,00	0,00	32	0	1	0	0,00		V2

Parts of the pipe systems can be copied and even complete pipe systems within a single branch can be copied when they are of a similar kind. Once a pipe is defined it can be the reference pipe, which then can be used as often as needed in a net. When a reference pipe is altered, all related pipes will change as well, automatically. Each pipe can have its own "C" factor.

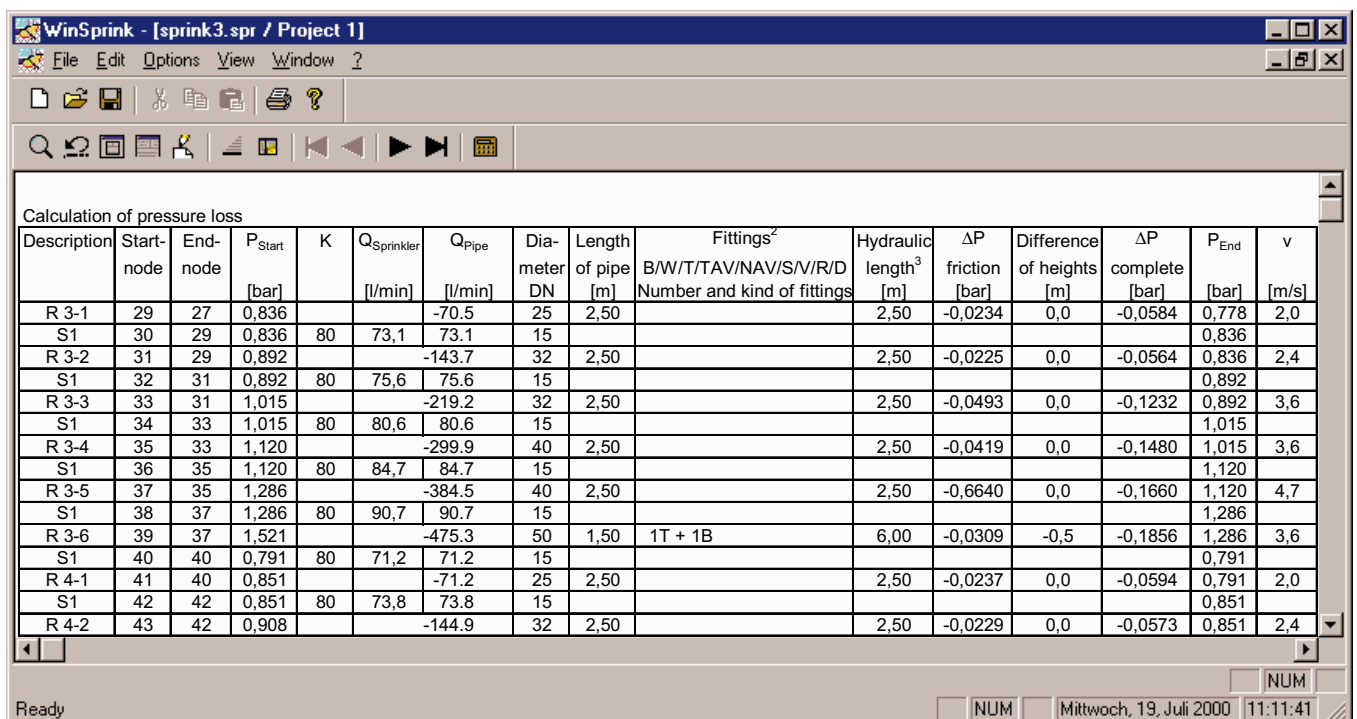
The selection of the equivalent length of the fittings is possible in a tabular form. The user can take advantage of the three standard tables (for VdS and FM) which are included in the program but he can also add user defined tables.



As much as needed operation areas can be added, processed and saved. The definition of the operation area is independent of the actual pipe geometry and can be changed at any time which is very important as in looped systems the position of the most unfavorable operation area is not known just from the beginning. These areas can only be located approximately step by step.

WinSprink is already able to fulfill a higher accuracy such as the form of the printed protocol which will soon be demanded by VdS in connection with certification. For each pipe segment the following specifications will be printed:

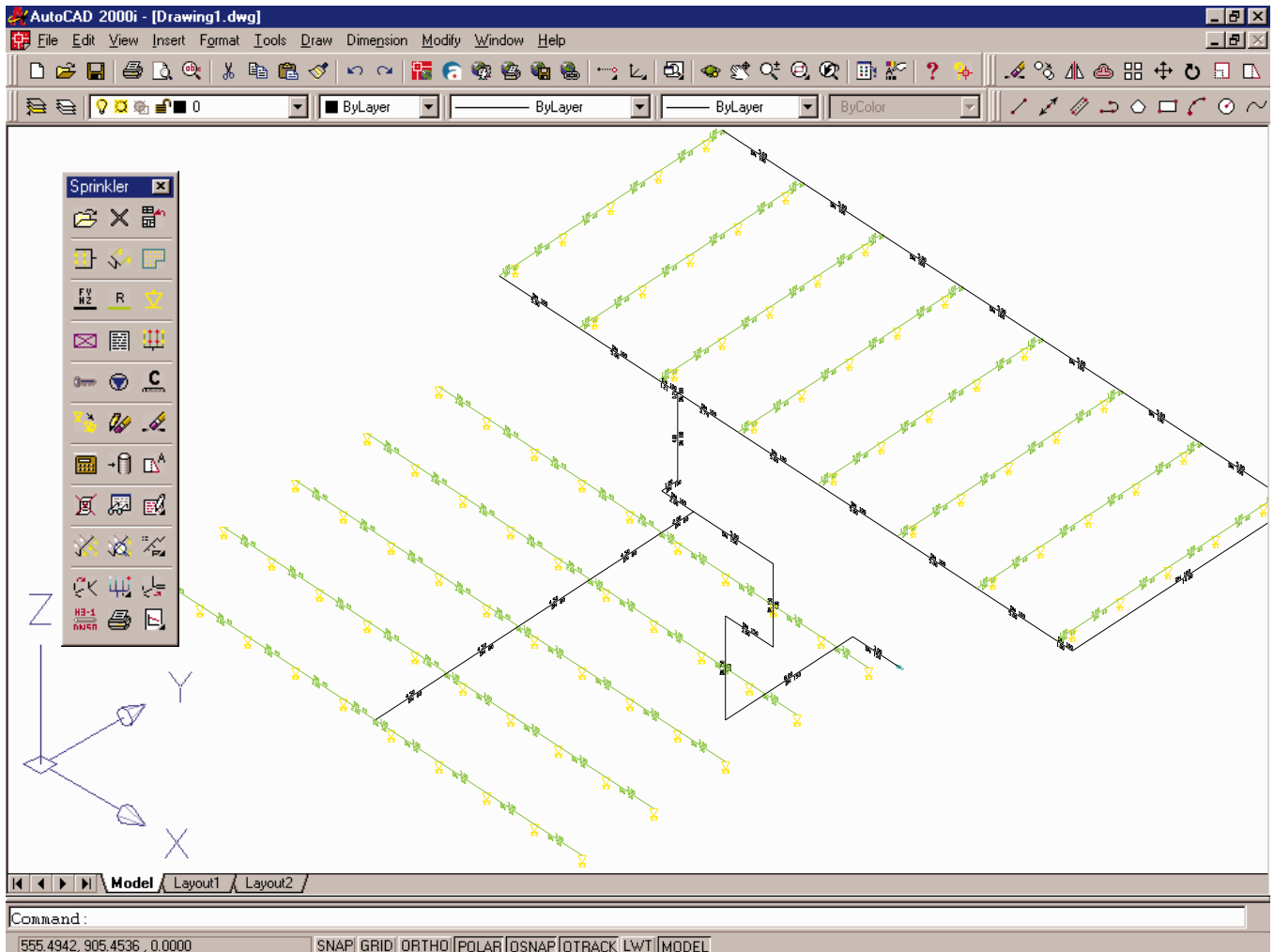
- | | |
|---|---------------------------------|
| The number of pipe | The number and kind of fittings |
| The beginning and ending node | The hydraulic length |
| The pressure at the beginning of pipe | The friction losses |
| For sprinklers: the "K" factor | The difference of heights |
| The discharge density of the sprinklers | The complete loss of pressure |
| The amount of water in the pipe | The pressure at the end of pipe |
| The diameter and length of the pipe | The flowing speed of the water |



Despite the high accuracy of calculation the results are determined very fast due to the optimized calculation method. The calculation is governmentally accepted and according NFPA, FM, LPC and VdS.

SpriCAD®

With SprriCAD® the input of pipe line geometry can be made alternatively with the CAD system AutoCAD. For AutoCAD you need the version 13, 14 or 2000 under Windows 95/98/NT or Windows 2000. The usage is very easy and transparent to the normal AutoCAD instructions.



The input is graphical alternatively in the plan view or in the isometric representation (it can be changed between these two views by pushing a button). Thus, it is easily possible to draw the sprinklers into an existing drawing (e.g. plan of architect).

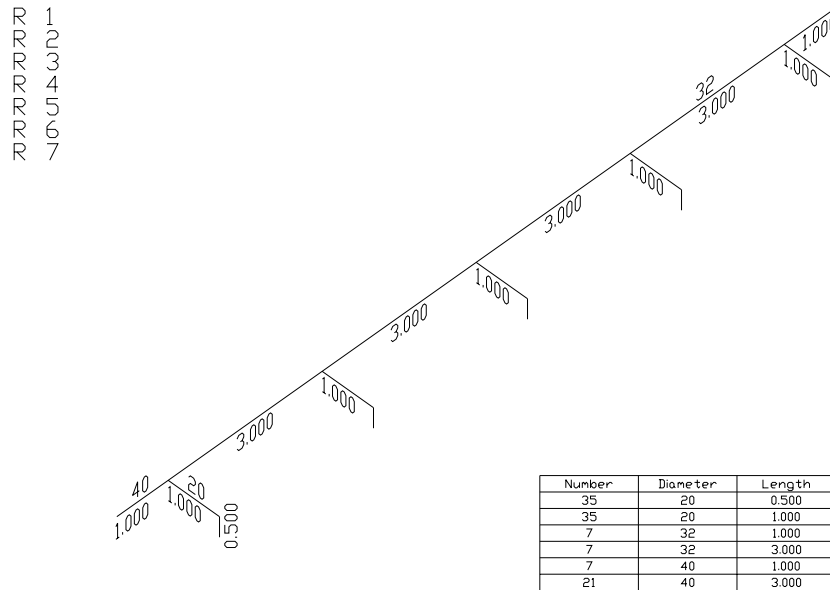
For each pipe length and its direction has to be defined. Each pipe will be drawn immediately. Hence, the input can be controlled directly. The positioning of the sprinklers can be made automatically by the program or manually.

Both, the location of the pump such as the most unfavorable sprinkler can be noticed by mouse click. Per mouse click all sprinklers within an operation area can be defined. All kinds of duplications of similar pipes are possible with this program, too. Changes of pipes or sprinklers are made by mouse, clicking the elements concerned. A dialog box appears on the screen, where the values can be changed.

By pointing out a command with the mouse all data will be passed on automatically to the calculation program WinSprink. With the result of calculation not only a printing of the whole system can be obtained (which is also possible with the calculation program itself) but also water relations in the net can be graphically shown. The flowing direction is depicted by arrows and the amount of water by different colors of the arrows. It is also possible to present the loss of pressure and the flowing speed graphically. Due to this visualization a general view can be obtained very quickly with reference to the floating amount of water in the pipe. Thus, an alternation of the pipe diameter can take influence on the net and optimize it.

After the definition of the pipe net there is a possibility to list up all needed parts into a data base. This data can be processed in different ways as needed (e.g. calculation, storage, purchasing department etc.).

Per button click forms can be made for the prefabrication. Similar pipes can be represented on only one DIN A 4 page. Every pipe is shown with reference to the pipe diameter graphically in isometric presentation and obtains a positioning number of the sprinkler drawing. On this page a production list will be given out in a tabular form containing all necessary parts.



Also diameter lists and a composition of all needed pipes will be constructed automatically.

Number	Diameter	Rest [m]
3	150	8
9	100	0
23	65	12
12	20	5

Number	Fitting	1 st Diameter	2 nd Diameter	3 rd Diameter
1	gate valve	150		
4	bend	150	150	
2	bend	100	100	
6	bend	65	65	
24	tee	100	100	65

A further advantage of the input of pipes via AutoCAD is the possibility of reusing the data of the geometry (e.g. planning of buildings, plan of architects etc.)

Thus, with SpriCAD® the following items can be processed:

- The hydraulic calculation of sprinklers
- The layout of the isometric representation
- The support for the construction of building site plans
- The making of part lists
- The automatic positioning of sprinklers
- The making of documents for the prefabrication
- For further processing: making data available for data base systems