Fike Corporation

ECARO-25 Flow Calculation

Software User's Manual

Contents

Introduction

The Fike ECARO-25 Flow Calculation software is an advanced application for predicting the flow characteristics of HFC-125 in a pipe network. Using sophisticated editing tools, you can accurately describe your system, and calculate the two-phase flow of the clean agent through the system.

Two new concepts in flow calculation software have been introduced with the release of this application. The first is in regard to enclosure volume definition. In addition to specifying the length, width, height of an enclosure, you may now draw the enclosure layout to calculate your volume. This will allow you to easily calculate volumes of oddly shaped rooms, as well as give you a drawing reference when entering your pipe network. You will instantly know if your pipe network has exceeded the physical parameters of the enclosure that contains it.

The second new concept is in regard to implementing multiple pipe networks within a single project. Using multiple pipe networks allows you to design systems that utilize the Modular System design concept. Properly designed Modular Systems typically use smaller agent storage containers as well as a far less complicated pipe network. You may now easily protect a large room with multiple small pipe networks, eliminating the need for expensive large cylinder manifolds and complicated single pipe network.

System Requirements

These are the Recommended Minimum Requirements for operating this software:

- IBM compatible personal computer with Pentium processor
- Microsoft Windows 98 Second Edition Operating System
- Microsoft Internet Explorer Version 5.5 or Higher
- 16 Megabytes RAM
- 10 Megabytes free hard disk space
- SVGA compatible graphics card and monitor
- Resolution of 800 x 600 pixels with 16-bit color
- CD-ROM Drive
- Windows compatible mouse or other compatible pointing device.
- Windows compatible printer

For optimum performance the following is recommended:

- Pentium III processor

- 64 Megabytes RAM (or the recommended RAM for your operating system)
- 50 Megabytes free hard disk space
- Resolution of 1024 x 768 pixels with 16-bit color.

Installing the Software

1. Close any running applications. You may need to shut down applications that are running in the Tool Tray.
2. Insert the ECARO-25 Flow Calc CD-ROM.
3. If Auto Run is enabled, the Installation Software will automatically begin.
4. If Auto Run is disabled, perform the following steps to begin the Installation Software:
    - Left Click the Start Button
    - Select Control Panel from the Settings Menu
    - Double-Click the Add/Remove Programs Icon
    - Click the Install Button from the Install/Uninstall Tab
    - Windows will search for the Setup.exe file on your CD-ROM Drive.
    - Click the Finish Button to begin the installation.
5. The Installation Software will guide you through the installation process.

Starting the Software

Locate the Fike ECARO-25 menu item in the Start Menu. Choose Fike ECARO-25 Flow Calc to start the software.

Obtaining a Software License

The Fike ECARO-25 Flow Calculation Software is protected by a copy protection mechanism. You will be required to obtain a Software License Registration Code from your local Fike Sales Outlet. The software will remain in evaluation mode until a valid license has been received.

Requesting a software license is a simple procedure:

1. Select 'Submit License Information…' from the Help Menu.
2. A License Information form will be shown. Fill out this form completely.
3. Start your Internet connection, and begin your email application.
4. Click on 'Email License Information' to submit the License Information to Fike.

NOTE: If you do not have an internet connection available, you can call Fike Customer Support and give your information to a Fike Customer Support representative.

You should receive an email from Fike with your Software License File. Save the attached file to your hard drive. You will need to find this file when you license the software.

To license the software using the license file supplied by Fike:

1. Select 'License Software' from the Help Menu.
2. A browser box will open. Locate the license file (06-262-XXXXXXXX.lic) on your hard drive and select 'Open'
3. You will be notified that the software has been licensed.

4. You must restart the Flow Calculation Software in order for your license to take effect.

Software Overview

The following topics will give you a brief overview of the major components of the software.

Project Setup

The first two screens you will need to work with are the Project Setup and Project Information screens. These screens allow you to specify items that will not change once you have started designing you project.

Project Setup: Use this screen to select the Unit System, Cylinder Hardware group, and Discharge Time.

Project Information: Enter Customer information and a Project description on this screen.

Define Enclosures

After the Project Setup, you must define the enclosure(s) in your project. Determining the enclosure volume and choosing the appropriate agent concentration is necessary in calculating the amount of clean agent required to protect the enclosure.

Enclosure Volume: This frame allows you to enter parameters that will be used to calculate the enclosure volume. You may enter the enclosure Length, Width and Height, or you may enter the enclosure Volume directly. You may also choose to draw the enclosure boundaries and specify the height. The Protected Volume value is the calculated volume of your enclosure.

Agent Requirements: This frame allows you to enter parameters that will be used to calculate the amount of clean agent required to protect the enclosure volume. Enter the design concentration, enclosure temperatures, and enclosure elevation. The Amount of Agent Required is the calculated weight of agent needed to flood the enclosure volume to the design concentration.

Specify Nozzles

After you have determined the enclosure volume and the amount of agent required, you must specify the number of nozzles used to discharge the agent into the enclosure. Each enclosure must have its own nozzles specified, and the amount of agent discharged from those nozzles must be greater than or equal to the amount of agent required to protect the enclosure.

Group Nozzles

After nozzles have been created to discharge agent into each enclosure, you now have to option to group these nozzles into distinct pipe networks. Each pipe network will consist of at least one nozzle for agent discharge, and one cylinder to source the agent. Grouping nozzles into separate pipe networks allows the software to calculate the amount of agent needed for the pipe network. This amount is the sum of the agent discharged from each nozzle in the pipe network.

Each pipe network must be drawn separately, and will require a separate flow calculation to be performed.

Specify Cylinders

After pipe networks have been created by grouping nozzles together, you now must specify the cylinder(s) needed to source the agent for the pipe network. For each pipe network you will select the quantity and type of cylinder to store the required agent. If multiple cylinders have been selected, you may edit the cylinder manifold parameters.

Pipe Network Layout

At this point we now know how many pipe networks are in the project, how much agent is required for each pipe network, and how many nozzles and cylinders are needed. You may now construct the pipe network, starting with the cylinder and piping to each of the nozzles. If you chose to draw the enclosures, you will be able to use them as a guide for determining how to layout your pipe network. After the pipe network is completely constructed, you can show the nozzle area coverage to see if your nozzles will completely cover the area of the enclosure.

You must construct a pipe network layout for each pipe network in your project.

Pipe Network Table

After the pipe networks have been constructed, you may now perform a flow calculation for each pipe network. Refreshing the Pipe Section data will build the pipe section data table from the pipe network that you constructed. You may specify pipe diameters, pipe schedules, and even nozzle orifice diameters if you wish. Performing the Flow Calc will actually execute the two-phase flow calculation algorithms, and report pressure drop and nozzle flow data.

You must execute a flow calculation for each pipe network in your project.

Print Project

You may at any time print out the current status of your project. The report will be shown in the print preview window, and you may jump to any page, and zoom in or out. You may print this report to any available printer, or you may save the report in PDF format.

Menu Item Descriptions

The following topics give descriptions for each available menu item.

System Toolbar

The *System Toolbar* provides direct access to the most often used menu item selections.

New

The *New* Toolbar button performs the same function as *New Project* from the *File Menu*.

Open

The *Open* Toolbar button performs the same function as *Open Project* from the *File Menu*.

Save

The *Save* Toolbar button performs the same function as *Save Project* from the *File Menu*.

Print

The *Print* Toolbar button performs the same function as *Print Project* from the *File Menu*.

Back

The *Back* Toolbar button is used to go back to the previous step in the flow calculation process.

Forward

The *Forward* Toolbar button is used to go on to the next step in the flow calculation process.

Setup

The *Setup* Toolbar button is used to show the *Project Setup* screen.

Info

The *Info* Toolbar button is used to show the *Project Information* screen.

Enclosure

The *Enclosure* Toolbar button is used to show the *Define Enclosures* screen.

Nozzle

The *Nozzle* Toolbar button is used to show the *Specify Nozzles* screen.

Groups

The *Groups* Toolbar button is used to show the *Group Nozzles* screen.

Cylinder

The *Cylinder* Toolbar button is used to show the *Specify Cylinders* screen.

Layout

The *Layout* Toolbar button is used to show the *Pipe Network Layout* screen.

Table

The *Table* Toolbar button is used to show the *Pipe Network Table* screen.

File Menu

This *File Menu* allows you to manage your project files, and set software preferences.

New Project

New Project creates a new project for you to work with. Currently loaded data is discarded (you will be prompted to save) and the software is ready for new data input. The *New Project* command is invoked automatically when the software is started, so there is no need to select *New Project* when you have just started the software.

Open Project

Open Project allows you to load data from a saved project file. You will be prompted with a standard Open File dialog box, and you may browse through your drives for the project file you wish to load. Project files are saved with a ".125" extension, and the browser defaults to this extension. When a project file is located, click Open to load the project. Clicking on Cancel will exit this screen without loading and return you to the main menu.

After the project file has been loaded, a message box will appear, informing you of which file was loaded.

Save Project

Save Project allows you to save the current project to disk. You will be prompted with a standard Save File dialog box if the project has never been saved. This prompt will be bypassed and the current filename will be used if the project had been saved previously. If a Save File dialog box does appear, type the filename you wish to use (you do not need to type the .125 extension) and click Save. Clicking on Cancel will exit this screen and return you to the main menu.

After the project has been saved to disk, a message box will appear, informing you that the project has been saved.

Save Project As

Save Project As allows you to save the current project to disk. You will always be prompted with a standard Save File dialog box, and you may type a filename (the .125 extension will automatically be added) in which to save the project. Clicking on Cancel will exit the prompt without saving your project.

After the project has been saved to disk, a message box will appear, informing you that the project has been saved.

Print Project

Print Project loads the print preview screen, and generates the report detailing your current project. You can view each page in the report, zoom in and out, change the page setup, and print the report using the toolbar at the top of the screen.

See the Print Project Topic for further information.

Preferences

Preferences let you set options that typically need to be set only once. You can enter your company name, address and contact information. This information will be used when a report is generated. The default unit system can be selected (SI or English). The screen aspect ratio correction can be entered here as well. Correcting the aspect ratio will allow the 3D rendering of you pipe network to be to scale. You must measure the red rectangle, and enter the length and width. The blue rectangle should be drawn to scale.

Exit

Exit lets you quit the program. If you have not saved your work, you will be prompted to save it.

Input Data Menu

This Input Data Menu is used to enter data that describes the entire pipe network system.

Data Input Wizard

The *Data Input Wizard* gives you step-by-step instructions, which helps guide you through the process of entering data. The wizard will lead you from screen to screen, giving helpful information on how you should proceed.

Project Setup

Project Setup allows you to setup items before any project data is entered. Typically, once data has been entered the *Project Setup* parameters cannot be changed.

See the Project Setup Topic for further information.

Project Information

Project Information allows you to identify your customer, as well as identify your project. This data will be used to generate a custom cover page for the project data report.

See the Project Information Topic for further information.

Define Enclosures

Define Enclosures allows you to enter data that describes the enclosures (hazards) that you will be protecting with HFC-125. A maximum of ten enclosures can be specified in any project. Information will be gathered to allow calculation of the enclosure volume, and the weight of clean agent needed to protect that volume at a given concentration.

See the Define Enclosures Topic for further information.

Specify Nozzles

Specify Nozzles allows you to select the number of nozzles used to discharge the required amount of clean agent into each defined enclosure. You can specify the type of nozzle, either 360° or 180°, and the weight of agent to be discharged from the nozzle.

See the Specify Nozzles Topic for further information.

Group Nozzles

Group Nozzles allows you to gather nozzles from all enclosures into different pipe networks. Each pipe network will be connected to one agent source, and a separate flow calculation will be needed for each pipe network.

See the Group Nozzles Topic for further information.

Specify Cylinders

Specify Cylinders allows you to define the agent source for each pipe network. Each pipe network will have defined a required agent amount, based upon the nozzles assigned to that pipe network. Single or multiple cylinders can be selected to contain the required agent amount. If multiple cylinders are needed, the cylinder manifold can be defined by entering specific data about the manifold.

See the Specify Cylinders Topic for further information.

Pipe Network Layout

Pipe Network Layout allows you to graphically enter each pipe network defined in the project. You can move and rotate your cylinders and nozzles, and connect pipes between them. Furthermore, graphical representations of enclosures can be created on this screen.

See the Pipe Network Layout Topic for further information

Pipe Network Table

Pipe Network Table allows you to view, and to a certain extent modify, the pipe section data for each pipe network. The pipe section data is the input to the flow calculation routines, while pressure drop data and nozzle flow data are the output. You may choose to edit the pipe diameters and pipe schedules, as well as specify the nozzle orifice diameters. The flow calculation must be run once for each pipe network defined in the project.

See the Pipe Network Table topic for further information.

Window Menu

The Window Menu allows you to manipulate how the windows are displayed, and lets you select which window is current.

Cascade Window

Cascade Window automatically arranges any open windows in a cascaded format.

Arrange Icons

Arrange Icons automatically arrange any minimized window icons.

Window List

Window List is a list containing all of the currently open windows. Selecting an item from the window list will activate that window, bringing it to the front.

Help Menu

The Help menu contains items that will offer help for a particular situation.

Help Topics

The *Help Topics* menu item allows you to browse through the online help system.

Troubleshooting Tips

The *Troubleshooting Tips* menu item will display the ECARO-25 Trouble Shooting Document. This document gives tips on how to fix Flow Calculation errors. You must have Adobe Acrobat Reader to view this PDF file.

Getting Started

The *Getting Started* screen is normally displayed when the software is started. This screen helps you Start a New Project, Open an Existing Project, or Exit to the Main Menu. If you do not want this screen to be displayed on startup, check the 'Do not Display' box at the bottom of the screen.

Submit License Information

The *Submit License Information* screen allows you to enter information required to obtain a license for your copy of this software. When all of the fields have been entered, you may email the information to Fike Corporation by clicking on 'Email License Information'

NOTE: You must have an Internet connection active and your email application loaded in order to submit your license information via email. If you do not have access to the Internet, call Fike Customer Support for assistance.

License Software

The *License Software* menu item allows you to license your copy of software by locating the license file sent to you by Fike Corporation. The license filename has the form '06-262-XXXXXXXX.lic".

About

The *About* menu item will display the software splash screen. This screen gives details about the software name, version, and license information.

Project Setup

The Project Setup screen allows you to enter information that affects the overall project. Typically this information is specified immediately after a project is created. There are three areas that need to be defined: Specifying the units system, selecting the cylinder hardware group, and system discharge time.

Select Unit System

Select Unit System frame gives you the option of selecting one of two units systems, SI units or English units.

SI Units

Select this button to specify SI units.

The International System of Units (SI) uses the following units:

Length is specified by meters. Pressure is specified by millibar. Temperature is in °C.

There are a few exceptions in specifying length. Millimeters will be used to specify nozzle orifice diameters and pipe diameters.

English Units

Select this button to specify English units.

The English system of units uses the following units:

Length is specified by feet. Pressure is specified by PSI. Temperature is in °F.

There are a few exceptions in specifying length. Inches will be used to specify nozzle orifice diameters and pipe diameters.

Select Cylinder Hardware Group

Select Cylinder Hardware Group frame lets you specify a particular set of cylinder types and configurations. Typically the target sales region will dictate which cylinder hardware group you will use.

DOT Cylinders with GCA

Select this button to use DOT approved cylinders with GCA actuation

DOT Cylinders with Solenoid Actuation

Select this button to use DOT approved cylinders with solenoid actuation.

European Cylinders with Solenoid Actuation

Select this button to use European approved cylinders with solenoid actuation.

OEM Cylinders

Select this button to use Fike Approved OEM cylinders.

Select Pipe Temperature

Select the ambient temperature of the pipe network under normal conditions. This temperature needs to be chosen carefully for accurate calculation of Initial Vapor Times.

Auto Input Update Disabled

Clicking the Auto Input Update button will enable or disable the Auto Input Update feature. When Auto Input Update is enabled, the flow calculation software will automatically set the Pipe Diameter, Pipe Schedule and Nozzle Orifice size on the Pipe Network Inputs table with the values calculated in the Flow Calculation Results table. The feature will allow you to make changes without having to copy each pipe diameter, schedule and nozzle size to every section of pipe.

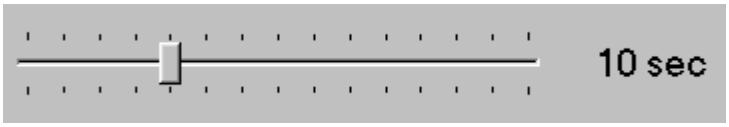
Default Pipe Schedule

The Default Pipe Schedule dropdown list allows you to select the pipe schedule you would like to normally use. Whatever pipe schedule you select in this box will be the default when you enter pipe in the Pipe Network Layout screen.

Select System Discharge Time

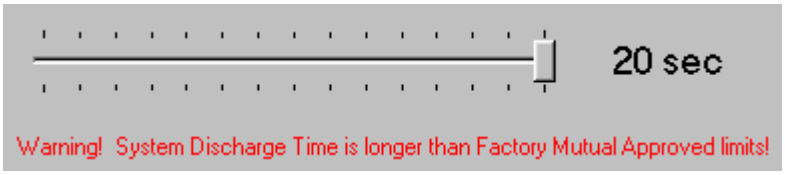
Select System Discharge Time frame lets you define the target discharge time for your system. This time affects each of the pipe networks defined in your project.

Normal Discharge Time



Normal System Discharge Time is 10 seconds. This should always be the default discharge time that you use.

Extended Discharge Time



Extended discharge times can be used for retrofitting certain Halon 1301 systems. Always try to run a flow calculation using the Normal discharge time of 10 seconds. If 10 seconds is not long enough to flow HFC-125 through your Halon pipe network, you may extend the discharge time out to 20 seconds.

NOTE: System Discharge Times greater than 10 seconds are not approved by Factory Mutual and require a greater design concentration of HFC-125.

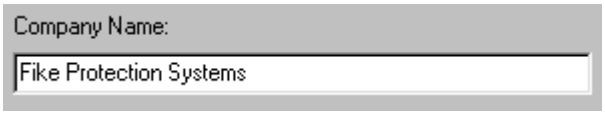
Project Information

The Project Information screen allows you to enter information describing the project and your customer. This data will be used to generate a custom cover page on the Print Project screen. There are two areas that you will need to define: Customer information, and the project description.

Customer Information

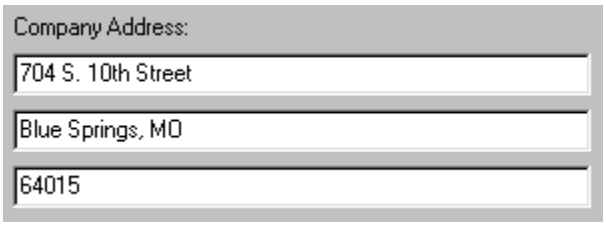
Customer Information frame contains areas that let you identify your customer.

Company Name



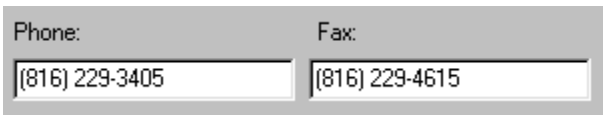
Company name describes who the customer is. Click in the text box to bring the cursor to this field. Any printable character may be typed in this field.

Company Address



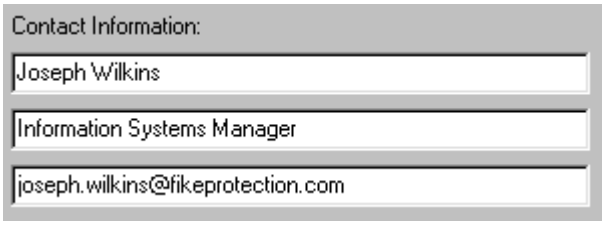
Company address describes the address where the customer is located. There are three fields associated with the customer address giving ample space to give a complete location. Click in one of the three text boxes to bring the cursor to that field. Any printable character may be typed in this field.

Phone and Fax Numbers



Company phone and fax numbers describes the numbers used to contact the customer. Click in one of the two text boxes to bring the cursor to that field. Any printable character may be typed in this field.

Contact Information



Contact information describes the person you are in contact with concerning this project. There are three fields associated with the contact information giving enough space to identify the contact person. Click in one of the three text boxes to bring the cursor to that field. Any printable character may be typed in this field.

Project Description

Project Description frame contains fields that let you describe your project.

Project Name

Project name gives an overall name to the project. Click in the text box to bring the cursor to this field. Any printable character may be typed in this field.

Project Location

Project location describes where the project is located. Click in the text box to bring the cursor to this field. Any printable character may be typed in this field.

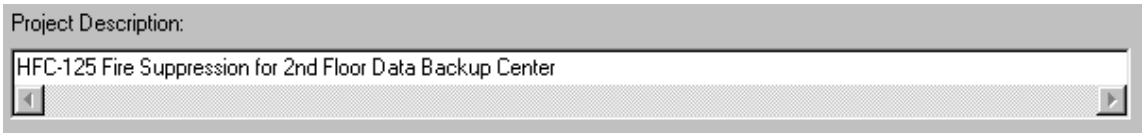
Project Designer

Project designer is typically your name. Whoever is responsible for the design of this project should enter their name in this field. Click in the text box to bring the cursor to this field. Any printable character may be typed in this field.

Project Account

Project account ties this project to some sort of billing. Typically the account number will be the customer account number to bill this project. Click in the text box to bring the cursor to this field. Any printable character may be typed in this field.

Project Description



Project description is a brief summary of the project. Click in the text box to bring the cursor to this field. Any printable character may be typed in this field.

Define Enclosures

One process in creating your project is to define the enclosures you will be protecting. Typically, an enclosure represents a volume that contains a particular hazard. There are two main factors that dictate the amount of clean agent needed to protect the enclosure. The first is the enclosure volume, and the second is the required agent concentration. The enclosure volume is derived from the physical dimensions of the room, while the agent concentration is derived from the type of hazard within the enclosure. Refer to the "ECARO-25 Installation and Operation Manual" for details on picking an adequate agent concentration for your particular hazard.

Select Enclosure

Use the Select Enclosure dropdown list to pick an enclosure to work with. Enclosure number 0001 is the default enclosure, and is always present in the list. This list is updated when enclosures are added or removed. Selecting an enclosure will cause the screen to be updated with the new enclosures parameters.

Add Enclosure

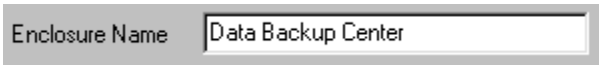
The Add Enclosure button allows you to create a new enclosure. This software allows a maximum of ten distinct enclosures within a single project. When ten enclosures have been created the Add Enclosure button will be disabled.

Delete Enclosure

The Delete Enclosure button allows you to delete an enclosure from your project. Clicking on the Delete Enclosure button will delete the currently selected enclosure. Enclosure number 0001 cannot be deleted, and if this enclosure is selected, the button will be disabled.

You will be prompted with an "Are You Sure?" message box before the enclosure is deleted. Any nozzles that have been specified for a deleted enclosure will also be deleted.

Enclosure Name



The Enclosure Name field allows you to enter a description of the enclosure. Click on the text box to bring the cursor to this field. Any printable characters may be entered into this field.

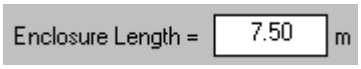
Enclosure Volume

The Enclosure Volume frame has fields that allow you to specify the physical dimensions of the enclosure. The Protected Volume is automatically calculated by using the dimensions you have entered.

There are three different ways to specify the protected volume of an enclosure:

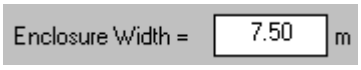
1. Enter the enclosure length, width, and height. (Valid only for rectangular shaped rooms)
2. Enter the enclosure volume directly. (Useful if you have no idea about the shape of the room)
3. Draw the enclosure layout using the Edit Enclosure Toolbar of the Pipe Network Layout screen. (This works well for non rectangular or odd shaped rooms)

Enclosure Length



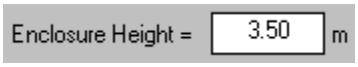
Enclosure length is the dimension parallel to the X-axis (if you will be drawing or Auto drawing the enclosure). Click on the text box to bring the cursor to this field. The valid number range is 0.00 to 1000.00. Press the enter key to accept the new length and update the screen.

Enclosure Width



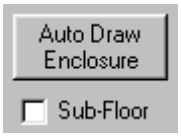
Enclosure width is the dimension parallel to the Y-axis (if you will be drawing or Auto drawing the enclosure). Click on the text box to bring the cursor to this field. The valid number range is 0.00 to 1000.00. Press the enter key to accept the new width and update the screen.

Enclosure Height



Enclosure height is the dimension parallel to the Z-axis (if you will be drawing or Auto drawing the enclosure). Click on the text box to bring the cursor to this field. The valid number range is 0.00 to 50.00. Press the enter key to accept the new height and update the screen.

Auto Draw Enclosure



If you have defined the length, width, and height of the enclosure, the Auto Draw Enclosure button will become enabled. Clicking this button will automatically draw the enclosure on the Pipe Network Layout screen. The enclosure will be centered about the origin.

Check the Sub floor box if you wish for the enclosure to be a sub floor. The sub floor will extend downward the amount specified in Enclosure Height.

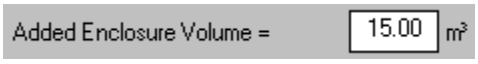
When an enclosure is auto drawn, the length, width, and height are no longer available for editing. Instead, you must use the Pipe Network Layout screen to edit the enclosure volume.

Maximum Volume

If you have entered length, width, and height dimensions for the enclosure this field will be automatically calculated for you. Otherwise if the length, width, and height are all zero, you may enter a volume here directly.

If you change the value in this field, the software will try to modify the length, width, or height to accommodate the newly entered value.

Added Enclosure Volume



Any value entered here will automatically be added to the enclosure volume. The enclosure protected volume will be updated accordingly.

Subtracted Enclosure Volume

Any value entered here will automatically be subtracted from the enclosure volume. The enclosure protected volume will be updated accordingly.

Protected Volume

The Protected Volume is always calculated by the software, using the enclosure volume plus the added enclosure volume minus the non-permeable volume.

The protected volume is used to determine the amount of clean agent needed to protect this enclosure.

Use Enclosure Layout to Calculate Volume

Check this box if you wish to draw the enclosure layout using the Edit Enclosure Toolbar in the Pipe Network Layout screen. If you have not already entered an enclosure height, you will be prompted to enter one. The Pipe Network Layout screen will automatically be loaded after this box has been checked.

If you uncheck this box, all enclosure volume information will be reset, and the enclosure will no longer be drawn on the Pipe Network Layout screen.

Agent Requirements

The agent requirements frame has fields that allow you to specify agent concentration and concentration variables. This information along with the enclosure volume information will allow the software to calculate the amount of clean agent needed to protect the enclosure.

Minimum Required Concentration

The minimum required concentration is the lowest concentration allowed after the system discharge. In some cases, the flow calculation software may predict an agent amount that is lower than the requested agent amount. The predicted concentration must be larger than or equal to the minimum required concentration for a valid system. If the Design Concentration is lower than the minimum required concentration, the Design Concentration will be increased.

Design Concentration

The design concentration is the target concentration you would like to see in the enclosure after an agent discharge. This concentration is directly linked to the type of hazard expected in the enclosure.

Minimum Temperature

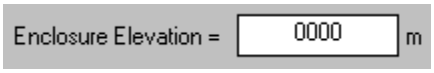
Enter the minimum temperature that you would expect the enclosure to experience. The minimum temperature directly affects the weight of agent needed to reach the Design Concentration levels after a discharge.

Temperature and weight of agent are inversely proportional. As the temperature in the enclosure decreases, the weight of agent needed to achieve the design concentration increases.

Maximum Temperature

Enter the maximum temperature that you would expect the enclosure to experience. The maximum temperature directly affects the maximum agent concentration after a discharge. You must verify that the maximum agent concentration will not exceed the published toxicity levels for the clean agent in this enclosure.

Enclosure Elevation



Enter the enclosure elevation, relative to sea level. The elevation of the enclosure directly affects the weight of agent needed to produce the design concentration.

Enclosure elevation and weight of agent are inversely proportional. As the elevation above sea level increases, the weight of agent needed to achieve the design concentration decreases.

Maximum Concentration

The maximum agent concentration is automatically calculated by the software and cannot be edited directly. The maximum concentration is calculated by using the weight of agent and the maximum enclosure temperature. You must verify that the maximum agent concentration will not exceed the published toxicity levels for the clean agent in this enclosure.

Agent Required

The agent required is automatically calculated by the software and cannot be edited directly. The calculation uses the enclosure protected volume, agent design concentration, minimum enclosure temperature, and enclosure elevation to arrive at a weight of agent needed.

Specify Nozzles

After defining the enclosures that need protection and determining the amount of clean agent required, nozzles must be specified to discharge the required amount of clean agent into the enclosure. Nozzles and enclosures are linked together; the amount of agent discharged by nozzles in an enclosure must equal the amount of clean agent required to protect the enclosure.

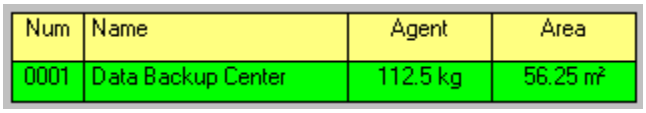
Enclosure Selection

Use the Enclosure selection dropdown list to pick an enclosure in which to specify nozzles. When an enclosure is selected, that enclosure will be highlighted in the Enclosure Summary Table, and the entire screen will be updated with the enclosure's nozzle specifications that have been entered.

Lock (Unlock) Nozzle Specification

After you have specified the nozzles needed for all of your enclosures, you can lock the data to prevent any accidental changes. Clicking on the 'Lock Nozzle Specification' button will toggle between Locked and Unlocked. Locked Nozzle Specifications cannot be changed, except by editing the Pipe Network Table.

Enclosure Summary Table



Num	Name	Agent	Area
0001	Data Backup Center	112.5 kg	56.25 m²

This table summarizes all of the enclosures that you have defined for your project. There are four fields in the table: Enclosure Number, Enclosure Name, Enclosure Agent, and Enclosure Area.

Enclosure Number

Num	Name	Agent	Area
0001	Data Backup Center	112.5 kg	56.25 m²

The Enclosure Number field shows the number of the enclosure in the table. Enclosure numbers range from 0001 to 0010, and are always in numerical order, with no gaps.

Enclosure Name

Num	Name	Agent	Area
0001	Data Backup Center	112.5 kg	56.25 m²

The Enclosure Name field shows the descriptive name assigned to the enclosure.

Enclosure Agent

Num	Name	Agent	Area
0001	Data Backup Center	112.5 kg	56.25 m²

The Enclosure Agent field shows the amount of clean agent required to protect the enclosure. The amount of clean agent discharged from the specified nozzles must equal this amount.

Enclosure Area

Num	Name	Agent	Area
0001	Data Backup Center	112.5 kg	56.25 m²

The Enclosure Area field shows the area occupied by the enclosure. This data is only valid if you used the length, width, and height, or the Pipe Network Layout screen to determine the enclosure volume.

Knowing the area of the enclosure can help you determine how many nozzles you might need to effectively discharge clean agent to the entire enclosure.

Nozzle Estimate

Estimated Number of Nozzles to Cover Area = 1

The Nozzle Estimate line gives an approximation of how many nozzles will be required to cover the entire area of the enclosure. Use this as a guide when selecting the number of nozzles needed for each enclosure.

NOTE: This information is only present if you chose to enter the enclosure LxWxH or you have drawn the enclosure on the Pipe Network Layout Screen.

Number of Nozzles

The number of nozzles frame has fields to select the quantity of nozzles that will discharge agent into the specified enclosure. A maximum of 99 nozzles can be specified for a single enclosure.

Number of Nozzles

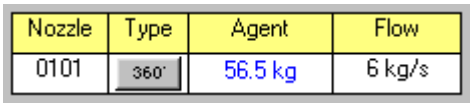
Use the Up/Down arrows to change the number of nozzles specified for this enclosure. As the quantity of nozzles changes, the nozzle table will be updated with the new quantity.

Auto Calculate Agent

When the Auto Calc Agent button is clicked, the required agent amount will be automatically distributed evenly among the specified nozzles. In cases where the required agent amount is not evenly divisible by the number of nozzles, the remainder of agent will be added to the last nozzle.

Nozzle Summary Table

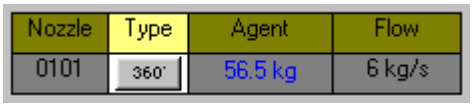
The Nozzle Summary Table shows the list of all nozzles specified for the selected enclosure. There are four fields in the Nozzle Summary Table: Nozzle Number, Nozzle Type, Nozzle Agent, and Nozzle Flow.



Nozzle Number

The Nozzle Number field shows the assigned nozzle number. Nozzles are assigned a four-digit number using the following convention. The first two digits are the enclosure number, and the last two digits are the nozzle number within that enclosure. The Nozzle numbered “0504” will be nozzle number four in enclosure number five.

Nozzle Type



There are two types of nozzles available, a 360° discharge, and a 180° discharge. Use the Nozzle Type button to toggle between the two types of nozzles. The 360° nozzles work best when centered within a room, and the 180° nozzles work best when lined up near a wall.

Nozzle Agent

The Nozzle Agent field is used to determine the amount of clean agent to be discharged from each nozzle. Click this field to edit the amount of agent discharged from the nozzle.

Nozzle Flow

The Nozzle Flow field is used a guide to determine the number of nozzles needed for an enclosure. The flow rate is determined by using the nozzle discharge amount divided by the System Discharge Time. It is recommended that you try to keep the flow rate near 10 kg/sec for a typical system.

Agent Remaining

The Agent Remaining line gives you a summary of how much more agent is required to be discharged by nozzles in this enclosure. If this number is positive, then you have not specified enough agent. You must either add more nozzles, or increase the amount of agent discharged from each nozzle. If this number is negative, then you have specified too much agent. You may always specify more agent than is required, but the actual agent concentration will be higher if too much agent is used.

Group Nozzles

We now begin the process of defining the source of the clean agent. We have already determined how much agent is required to protect each enclosure, and we have specified nozzles to discharge the agent within each enclosure. By grouping nozzles together, we can define multiple pipe networks. Nozzles that are grouped together will all be connected to the same pipe network, and ultimately be connected to the same agent source.

Select Pipe Network

Use the Select Pipe Network dropdown list to pick a pipe network to work with. Pipe Network 0001 is the default pipe network, and is always present in the list. This list is updated when pipe networks are added or removed. Selecting a pipe network will cause the screen to be updated with those pipe network parameters.

Add Pipe Network

The Add Pipe Network button allows you to create a new pipe network. This software allows a maximum of ten distinct pipe networks within a single project. When ten pipe networks have been created, the Add Pipe Network button will be disabled.

Delete Pipe Network

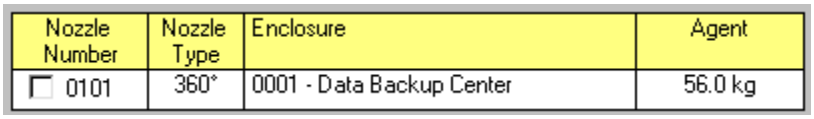
The Delete Pipe Network button allows you to delete a pipe network from your project. Clicking on the Delete Pipe Network button will delete the currently selected pipe network. Pipe Network number 0001 cannot be deleted, and if this pipe network is selected, the Delete Pipe Network button will be disabled.

You will be prompted with an "Are You Sure?" message box before the pipe network is deleted. Nozzles that have been assigned to the deleted pipe network will be automatically assigned to Pipe Network number 0001.

Pipe Network Name

Pipe Network Name field allows you to enter a description of the pipe network that you have defined. Click on the text box to bring the cursor to the field. Any printable character may be entered into the field.

Nozzle Summary Table



Nozzle Number	Nozzle Type	Enclosure	Agent
☐ 0101	360°	0001 - Data Backup Center	56.0 kg

The Nozzle Summary Table lists all of the nozzles that have been assigned to the selected pipe network.

Nozzle Number

Nozzle Number	Nozzle Type	Enclosure	Agent
☐ 0101	360°	0001 - Data Backup Center	56.0 kg

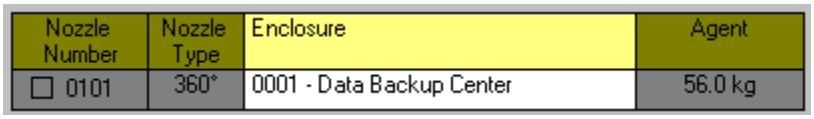
The Nozzle Number field allows you to select multiple nozzles by checking the box next to the number. Nozzles that have been checked may be moved to a new pipe network. As nozzles are checked, the Selected Agent Amount line will be updated with the sum of agent discharged from the selected nozzles.

Nozzle Type

Nozzle Number	Nozzle Type	Enclosure	Agent
☐ 0101	360°	0001 - Data Backup Center	56.0 kg

The Nozzle Type field shows you if the nozzle is a 360° discharge or a 180° discharge nozzle.

Enclosure



Nozzle Number	Nozzle Type	Enclosure	Agent
☐ 0101	360°	0001 - Data Backup Center	56.0 kg

The Enclosure field shows you the enclosure number and name that is linked to this nozzle.

Agent

Nozzle Number	Nozzle Type	Enclosure	Agent
☐ 0101	360°	0001 - Data Backup Center	56.0 kg

The Agent field shows you the amount of clean agent that will be discharged from the nozzle.

Total Agent Amount

The Total Agent Amount line shows you the total amount of agent required to be sourced in the pipe network. This total is calculated by summing the agent discharge amounts of each nozzle assigned to the selected pipe network.

Selected Agent Amount

The Selected Agent Amount line shows you the amount of agent you have selected by checking the boxes next to each nozzle number. This gives you an idea of how much agent you will be adding to a different pipe network if you use the Move Nozzles button.

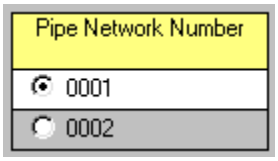
Move Nozzles to New Pipe Network

The Move Nozzles button allows you to move nozzles from one pipe network to another. To perform a nozzle move, there must be more than one pipe network defined; otherwise the Move Nozzles button will be disabled. Select the nozzles you wish to move by checking the boxes next to the nozzle number. Select the pipe network number to move the nozzles to by selecting the appropriate pipe network from the Pipe Network Summary Table. Click on the Move Nozzles button and the nozzles will be moved as requested.

Pipe Network Summary Table

The Pipe Network Summary gives a complete list of all pipe networks defined in your project. A maximum of ten pipe networks may be defined within a single project. Each line will list a different pipe network by its number.

Pipe Network Number



The pipe network number listed in the Pipe Network Summary Table is used to specify where nozzles will be moved. To select a pipe network as a nozzle destination, click the button next to the pipe network number. Only one pipe network may be selected at a time.

Specify Cylinders

At this point we have defined all of the pipe networks in our project, and we know how much agent is required to be distributed by each network. We now have enough information to pick the cylinders that will contain the agent for each pipe network.

The Specify Cylinders screen allows you to choose cylinders that will source the agent. If multiple cylinders are needed to contain the agent, you will be able to define the cylinder manifold.

Select Pipe Network

Use the Select Pipe Network dropdown list to pick a pipe network to work with. All of the pipe networks that have been defined will be present in this list. You must create a cylinder for each pipe network in your project.

When a pipe network is selected, the cylinder parameters will be shown on the screen.

Lock (Unlock) Cylinder Specification

After you have specified the cylinders needed for all of your pipe networks, you can lock the data to prevent any accidental changes. Clicking on the 'Lock Cylinder Specification' button will toggle between Locked and Unlocked. Locked Cylinder Specifications cannot be changed, except by editing the Pipe Network Table.

Select Number of Cylinders

This frame allows you to select the number of cylinders that will store the agent required by the pipe network. As you change the number of cylinders, the values for Agent per cylinder and Total Stored agent will be updated.

Number of Cylinders

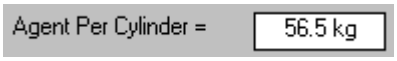
Use the Up/Down arrows to increase or decrease the number of cylinders containing the required agent. Typically the smallest number of cylinders is best, but there may be times when physical constraints require you to use more cylinders.

When the number of cylinders changes, the values for Agent Per Cylinder and Total Stored Agent will be updated.

Total Agent Required

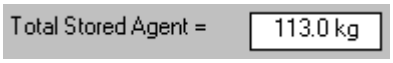
The Total Agent Required line shows you the amount of agent that is required by the pipe network. This number is defined by the number of nozzles grouped in this pipe network.

Agent Per Cylinder



The Agent Per Cylinder line shows you how much agent will reside in each cylinder. Each cylinder in the pipe network must contain the same amount of agent. This value is calculated by dividing the total agent required by the number of cylinders selected. The agent amount is rounded up to the nearest 0.5 kg to accommodate fill station tolerances.

Total Stored Agent



The Total Stored Agent line shows you how much agent you will need to purchase for the selected pipe network. In a manifold system, this number is typically higher than the total agent required, because of the rounding that occurs when calculating the Agent Per Cylinder.

Select Cylinder Type

The Select Cylinder type frame allows you to choose a specific cylinder from a list of available cylinders. The Cylinder Hardware Group setting from the Project Setup screen determines which cylinders are available.

Cylinder Type

The Cylinder Type dropdown list allows you to select a cylinder from the list of cylinders available to you. The available cylinders are chosen from the specific Cylinder Hardware Group that was selected in the Project Setup screen.

When you choose a cylinder from the dropdown list, the physical parameters of the cylinder will be shown in the table. If the table is highlighted in RED, the cylinder will not be capable of storing the amount of agent required by the Agent Per Cylinder field. If the table is highlighted in GREEN, you have chosen a cylinder that will contain the agent.

Auto Pick Cylinder (Minimum Fill Density)

Click the Auto Pick Cylinder (Min Fill) button to automatically choose the cylinder required to contain the agent specified by the Agent Per Cylinder field. If more than one cylinder will meet the fill range requirements, then the cylinder with the largest internal volume will be selected.

If the Cylinder Type specifies “No Cylinder” then there is no cylinder available to meet your current requirements. Typically that means you must increase the number of cylinders in order to decrease the amount of Agent Per Cylinder.

Auto Pick Cylinder (Maximum Fill Density)

Click the Auto Pick Cylinder (Max Fill) button to automatically choose the cylinder required to contain the agent specified by the Agent Per Cylinder field. If more than one cylinder will meet the fill range requirements, then the cylinder with the smallest internal volume will be selected.

If the Cylinder Type specifies "No Cylinder" then there is no cylinder available to meet your current requirements. Typically that means you must increase the number of cylinders in order to decrease the amount of Agent Per Cylinder.

Cylinder Volume

Cylinder Volume	Min Fill Weight	Max Fill Weight	Cylinder Diameter	Cylinder Height	Valve Diameter
0.0830 m³	34 kg	66 kg	0.3226 m	1.3411 m	50.0 mm

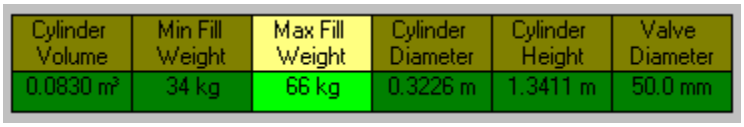
The Cylinder Volume field shows you the internal volume (m^3) of the selected cylinder type.

Min Fill Weight

Cylinder Volume	Min Fill Weight	Max Fill Weight	Cylinder Diameter	Cylinder Height	Valve Diameter
0.0830 m³	34 kg	66 kg	0.3226 m	1.3411 m	50.0 mm

The Min Fill Weight field shows you the minimum amount of agent (kg) that can be contained in the selected cylinder.

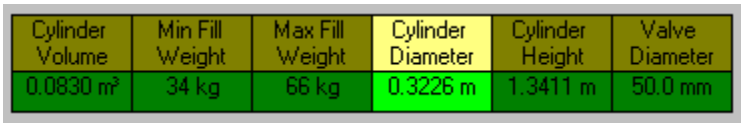
Max Fill Weight



Cylinder Volume	Min Fill Weight	Max Fill Weight	Cylinder Diameter	Cylinder Height	Valve Diameter
0.0830 m³	34 kg	66 kg	0.3226 m	1.3411 m	50.0 mm

The Max Fill Weight field shows you the maximum amount of agent (kg) that can be contained in the selected cylinder.

Cylinder Diameter



Cylinder Volume	Min Fill Weight	Max Fill Weight	Cylinder Diameter	Cylinder Height	Valve Diameter
0.0830 m³	34 kg	66 kg	0.3226 m	1.3411 m	50.0 mm

The Cylinder Diameter field shows you the outside diameter (m) of the selected cylinder.

Cylinder Height

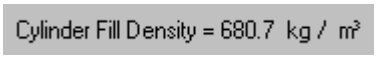
Cylinder Volume	Min Fill Weight	Max Fill Weight	Cylinder Diameter	Cylinder Height	Valve Diameter
0.0830 m³	34 kg	66 kg	0.3226 m	1.3411 m	50.0 mm

The Cylinder Height field shows you the height (m) of the selected cylinder.

Cylinder Valve Diameter

The Cylinder Valve Diameter field shows you the diameter (mm) of the selected cylinder valve outlet.

Cylinder Fill Density



The Cylinder Fill Density line shows you the calculated fill density of the selected cylinder. This number is calculated by dividing the Total Stored Agent by the Cylinder Volume.

Select Manifold Type

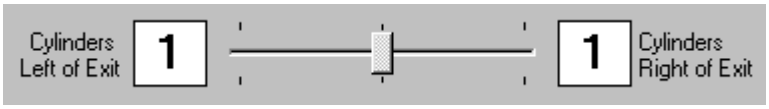
The Select Manifold Type frame allows you to define the location of the manifold outlet. There are two main manifold types; Center Exit and End Exit. The Center Exit manifold will have at least one cylinder on either side of the outlet. The End Exit manifold will have all cylinders on one side of the outlet.

Manifold Type

There are three mutually exclusive selections for Manifold type. To select a manifold type, click the button next to the type of manifold.

1. No Manifold – This type is only available if there is exactly one cylinder.
2. Center Exit Manifold – This type requires at least one cylinder on each side of the outlet. This is the only type available in a Main/Reserve System.
3. End Exit Manifold – This type requires all of the cylinders to be on one side of the outlet or the other.

Manifold Outlet Location



The slider bar allows you to select the manifold outlet location. By dragging the slider bar left or right, the number of cylinders on the left or right of the outlet will change. This slider bar is disabled in the case of a Main/Reserve System, which requires the same number of cylinders on each side of the outlet.

Main / Reserve System

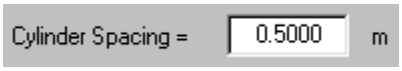
Use the Main/Reserve System check box to select if a main/reserve system is required. The main/reserve system manifold type will automatically be set to Center Exit. The number of cylinders selected will appear on both sides of the outlet.

In terms of flow calculation performance, a main/reserve system is equivalent to a main only system with an end exit manifold. The reserve cylinders are not included in the flow calculation, they are only present to help with cylinder placement, and parts list generation.

Manifold Parameters

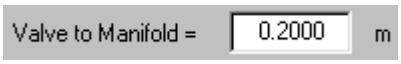
The Manifold Parameters frame allows you to enter physical dimensions of your manifold. There are four parameters that define the manifold: Cylinder Spacing, Spacing from the Valve to the Manifold, Check Valve Equivalent length, and Spacing from Cylinder to Manifold Exit

Cylinder Spacing



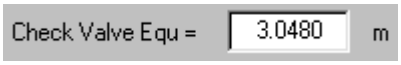
The Cylinder Spacing field allows you to define the center to center distance between two adjacent cylinders. The minimum cylinder spacing is equal to the diameter of the cylinder, which would place the cylinders right next to each other. Click in the text box to bring the cursor to this field, then type in the cylinder spacing.

Valve to Manifold



The Valve to Manifold field allows you to define the vertical distance between any cylinder valve outlet and the horizontal manifold main feed. Click in the text box to bring the cursor to this field, then type in the valve to manifold spacing.

Equivalent Length



The Equivalent Length field allows you to enter any added equivalent length in the manifold. Typically this will reflect the added equivalent length of the check valve following each cylinder valve outlet. Click in the text box to bring the cursor to this field, then type in the equivalent length.

Cylinder to Exit

The Cylinder to Exit field allows you to define the distance from the center of the cylinder nearest the manifold exit to the center of the manifold exit itself. Click in the text box to bring the cursor to this field, then type in the cylinder to exit distance.

Pipe Network Layout

The Pipe Network Layout screen is where the majority of the design takes place. When enclosure volumes have been defined, agent requirements calculated, nozzles specified to discharge agent, pipe networks defined, and cylinders specified to source the agent, the pipe network itself can be drawn.

This screen gives you tools that make easy work of entering in a physical pipe network from cylinder to nozzle. The following topics will give you the details of how to enter a pipe network layout into you project.

There are five toolbars; the View Toolbar, Edit Pipes Toolbar, Edit Enclosure Toolbar, Pipe Network Select Toolbar, and the Enclosure Select Toolbar. Use these toolbars to enter or change the pipe network layout.

There are two view ports; the Top Orthogonal View and the Isometric View. The Top Orthogonal view shows you the pipe network as if you were looking down upon it. The Isometric View is a 3D rendering of the pipe network. You can rotate the display to view the pipe network from nearly any angle.

View Toolbar

The View Toolbar has items that affect the way in which you will look at your pipe network design. There are tools to allow you to zoom the display in and out, pan the display, create and show custom grids, rotate the isometric view port, and switch between the top orthogonal view and the isometric view.

Select

Click the Select button to change the mouse action to select object mode. With this button selected, mouse clicks on either view will result in the selection of an object.

Mouse Move

Click the Mouse Move button to change the mouse action to mouse move mode. With this button selected, you may pan either view. Click and hold the mouse at the location you wish to move. Drag and release the mouse at the location you wish to move to.

Zoom In

Click the Zoom In button to make the pipe network appear larger in each view port. The current scale factor will be shown at the bottom of the screen

Zoom Out

Click the Zoom Out button to make the pipe network appear smaller in each view port. The current scale factor will be shown at the bottom of the screen.

Zoom Window

Use the Zoom Window button to fill the view port with an area that you select. Click and drag a rectangular window from one corner to the opposite corner. When you have dragged a large enough window, release the mouse button to complete the zoom function. The area you enclosed with the rectangle will now fill the view port.

This function can be used in either view port. Right click or press the ESC key to cancel the Zoom Window function.

Zoom All

Use the Zoom All button to have the software pick the scale factor so all of your data can be seen on the Isometric view port.

Rotate Isometric

Use the Rotate Isometric buttons to rotate the isometric view clockwise or counter-clockwise in increments of 5°. The axis of rotation is defined by the X-Axis or Z-Axis Rotate buttons.

X-Axis Rotate

Clicking the X-Axis rotate button will define X as the axis of rotation when using the Rotate Isometric buttons.

Z-Axis Rotate

Clicking the Z-Axis rotate button will define Z as the axis of rotation when using the Rotate Isometric buttons.

Default Isometric

Clicking the Default Isometric button will set the rotation to the default isometric values.

Pan Top View

Clicking on any of the Pan buttons will pan the Top view port in the specified direction.

Center Top View

Click on the Center Top View button will cause the center of the top view port to be located at the currently selected object, or the origin.

Show Grid

The Show Grid button will turn the Top View port grid on or off.

Change Grid

The Change Grid button will allow you to change the current grid spacing. You will be prompted to enter the new grid spacing. If you choose a grid that is too small for the current scale factor, you will be notified and the grid will not change.

Snap to Grid

The Snap to Grid button will toggle the grid snap feature on or off. When snap to grid is activated, any object that you place on the Top Orthogonal view port will be automatically placed on the nearest grid point.

Toggle View

The Toggle View button will switch the view port display between the Top Orthogonal view and the Isometric view. If both views are displayed at the same time, the toggle view button will switch to the smallest view port.

Edit Pipes Toolbar

The Edit Pipes Toolbar has items that allow you to place or delete pipe objects. There are tools to add pipe segments, fittings, move cylinders, move nozzles, and delete objects.

Add Pipe

The Add Pipe button allows you to create a new pipe segment and attach it to the output side of a cylinder or fitting. You will be prompted to enter a pipe length and then the pipe segment will be drawn. Add Pipe is enabled only if you select a cylinder or fitting object. Direction of the pipe is determined automatically by the direction of the input object.

Add 90° Elbow

The Add 90° Elbow button allows you to create a new elbow object and attach it to a pipe. Add 90° Elbow is only enabled if you select the free end of a pipe object. The initial direction is automatically determined, but you can change the output direction by using the Rotate Part button.

Add 45° Elbow

The Add 45° Elbow button allows you to create a new elbow object and attach it to a pipe. Add 45° Elbow is only enabled if you select the free end of a pipe object. The initial direction is automatically determined, but you can change the output direction by using the Rotate Part button.

NOTE: 45° Elbows are always automatically placed in pairs with a single pipe between them. The output direction of the second 45° elbow is always the same direction as the input of the first 45° elbow.

Add Bullhead Tee

The Add Bullhead Tee button allows you to create a new bullhead tee and attach it to a pipe. Add Bullhead Tee is only enabled if you select the free end of a pipe object. The initial direction is automatically determined, but you can change the output direction by using the Rotate Part button.

Add Side-Thru Tee

The Add Side-Thru Tee button allows you to create a new side-thru tee and attach it to a pipe. Add Side-Thru Tee is only enabled if you select the free end of a pipe object, and the pipe is not vertical. The initial direction is automatically determined, but you can change the output direction by using the Rotate Part button.

Add Union / Coupling

The Add Union/Coupling button allows you to create a new union or coupling and attach it to a pipe. Add Union/Coupling is only enabled if you select the free end of a pipe object. Direction of the union or coupling is determined automatically by the direction of the input pipe object.

Move Cylinder

The Move Cylinder button is used to move a cylinder a new location. The top orthogonal view port is used to move the cylinder. When you click on the Move Cylinder button, a rubber band line will extend from the original cylinder location to the current cursor location. Locate the cursor where you want to move the cylinder and click the left mouse button. Move Cylinder is only available if you have selected a cylinder object and there are no pipe objects connected to it.

Connect Cylinder to Pipe

The Connect Cylinder to Pipe button is used to connect a cylinder to the free input end of a pipe, automatically placing the cylinder at the position of the pipe input. After you have clicked on the Connect Cylinder button, you must select a cylinder by clicking on a cylinder object. Connect Cylinder is only available if you have currently selected a pipe that has no input object.

Free Cylinder from Pipe

The Free Cylinder from Pipe button is used to free a cylinder or manifold that is currently connected to the input of a pipe object. The Free Cylinder button is only available if you have selected a cylinder object that is currently connected to a pipe.

Move Nozzle

The Move Nozzle button is used to move a nozzle to a new location. The top orthogonal viewport is used to move the nozzle. When you click on the Move Nozzle button, a rubber band line will extend from the original nozzle location to the current cursor location. Locate the cursor where you want to move the nozzle and click the left mouse button. Move Nozzle is only available if you have selected a nozzle object and there are no pipe objects connected to it.

Connect Nozzle to Pipe

The Connect Nozzle to Pipe button is used to connect a nozzle to the free end of a pipe, automatically placing the nozzle at the pipe output position. After you have clicked on the Connect Nozzle button, you must select a nozzle by clicking on a nozzle object. Connect Nozzle is only available if you have currently selected a vertical pipe that has no output object.

Free Nozzle from Pipe

The Free Nozzle from Pipe button is used to free a nozzle that is currently connected to the outlet of a pipe object. The Free Nozzle button is only available if you have selected a nozzle object that is currently connected to a pipe.

Rotate Part

The Rotate Part button is used to rotate a selected part. Parts that can be rotated are elbows, tees, cylinder manifolds, and 180° nozzles. Every time you click the rotate part button, the select part will rotate to the next available position.

Delete Part

The Delete Part button is used to delete a part from the pipe network. Only pipes and fittings can be deleted. Cylinders and Nozzles must be deleted from their specification screens. Delete part will only be available if the selected part has no other parts connected to its output.

Part Properties

The Part Properties button brings the part property screen into view. This screen shows the parameters of the selected part. Displayed parameters include location, input object, output object, etc.

Cut Downstream Pipe

The Cut Downstream Pipe button deletes all piping downstream of the selected point and places that pipe in the Pipe Clipboard. If the downstream pipe is connected to nozzles, then the nozzles will automatically be disconnected from the pipe.

Copy Downstream Pipe

The Copy Downstream Pipe button copies all piping downstream of the selected point and places that pipe in the Pipe Clipboard. Nozzles will not be copied into the Pipe Clipboard.

Paste Downstream Pipe

The Paste Downstream Pipe button connects the pipe stored in the Pipe Clipboard to the selected point. Several checks are made to make sure that the connection will be valid. Pipes can only be pasted on to a fitting, and similarly fittings can only be pasted on to pipe. Vertical sections of pipe can only be pasted on to another vertical section of pipe. Horizontal sections of pipe will be rotated to line up with the selected point.

Delete Downstream Pipe

The Delete Downstream Pipe button will delete all piping that is downstream from the selected point. Nozzles will not be deleted, but they will be disconnected from any deleted pipe. You will be asked for confirmation of the operation, since it cannot be undone.

Delete All Pipe

The Delete All Pipe button will delete all piping in the selected pipe network. Nozzles and Cylinders will not be deleted, but the will be disconnected from any deleted pipes. You will be asked for confirmation of the operation, since it cannot be undone.

Save Downstream Pipe to File

The Save Downstream Pipe to file button allows you to save piping to a file for later use. You will be prompted to enter a path and filename for the pipe to be saved. The default extension will be .SEC for pipe section. Nozzles and cylinders will not be saved to the file.

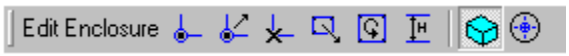
Paste Downstream Pipe from File

The Paste Downstream Pipe from file button allows you to paste piping from a file that was saved earlier. You will be prompted to browse for the pipe file to load. This pipe section will be loaded into the Pipe Clipboard allowing you to paste the section multiple times.

Show Pipe Clipboard

The Show Pipe Clipboard allows you to see what is currently saved in the Pipe Clipboard. The current view will be replaced with a rendering of the piping in the Pipe clipboard. Any operation will restore the view to the real pipe network.

Edit Enclosure Toolbar



The Edit Enclosure Toolbar is used to create or modify an enclosure layout. This toolbar is only available if the selected enclosure was defined with its Use Layout parameter enabled.

Add Corner

The Add Corner button allows you to create a new corner for your enclosure. A rubber band line will be drawn from the currently selected corner to the cursor location. Click the left mouse button to place the new corner. The last corner and the first corner will automatically be joined together.

Move Corner

The Move Corner button allows you to move any enclosure corner from one location to another. This button is only available when you have selected an enclosure corner. A rubber band line will be drawn from the currently selected corner to the cursor location. Click the left mouse button to move the corner to the new location.

Delete Corner

The Delete Corner button allows you to delete any enclosure corner. This button is only available when you have selected an enclosure corner. When a corner is deleted, the corners before and after will be automatically joined together.

Move Enclosure

The Move Enclosure button allows you to move an entire enclosure from one location to another. The currently selected corner will be the movement reference point. A rubber band line will be drawn from the currently selected corner to the cursor location. Click the left mouse button to move the enclosure to the new location.

Rotate Enclosure

The Rotate Enclosure button allows you to rotate an enclosure a specific number of degrees. The center of rotation will be the currently selected enclosure corner. Positive angles will rotate the enclosure counter clockwise and negative angles will rotate the enclosure clockwise.

Change Height

The Change Height button allows you to change the height of an enclosure. You will be prompted to enter the new height and the enclosure will be redrawn.

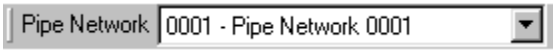
Show Enclosures

The Show Enclosures button allows you to either view or hide all drawn enclosures.

Show Nozzle Area Coverage

The Show Nozzle Area Coverage allows you to view the circular area coverage of each nozzle, allowing you to place the nozzles where you can protect the entire area of the enclosure. The 360° nozzles will show an entire circle and the 180° nozzles will show a half-circle.

Pipe Network Select



The Pipe Network Select dropdown list allows you to select a pipe network to edit. The currently selected pipe network will be drawn in various colors. The unselected pipe networks will be drawn "grayed out". You may only select objects that are contained within the selected pipe network.

Enclosure Select

The Enclosure Select dropdown list allows you to select an enclosure to edit. The currently selected enclosure will be drawn with corner numbers displayed. The unselected enclosures will be drawn without corner numbers. You may only select corners that are contained within the selected enclosure.

Pipe Network Table

The Pipe Network Table screen is where you perform the actual flow calculation and view the results. There are four main areas on this screen, each of which contains different types of data. The Pipe Section portion contains the list of Pipe Section Numbers. The Pipe Network Inputs portion contains all of the data that is input into the Flow Calculation routine. The Flow Calculation Results portion contains the output of the Flow Calculation routine. The Message portion contains any messages generated by the Flow Calculation routine.

A separate flow calculation must be performed for each pipe network in the project.

Select Pipe Network

Use the Select Pipe Network dropdown list to pick a pipe network to work with. All of the pipe networks that have been defined will be present in this list. You must perform a flow calculation for each pipe network in your project.

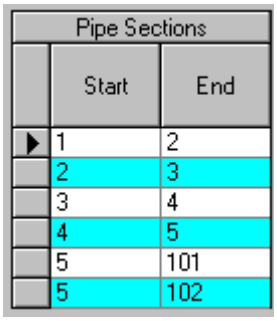
Restore Pipe Section Data

The Restore Pipe Section Data button is used to fill in the Pipe Section Data table. The software examines the selected pipe network and creates entries for each pipe section. You will lose any of the Pipe Network Input data fields that have been changed.

Perform Flow Calculation

The Perform Flow Calculation button is used to start the flow calculation process. The pipe section data will be checked for errors first, and then the flow calculation for each section will begin. Results will be posted in the Flow Calculation Results table.

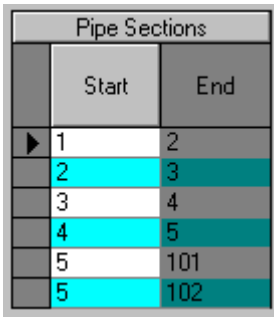
Pipe Sections Table



Pipe Sections		
	Start	End
▶	1	2
	2	3
	3	4
	4	5
	5	101
	5	102

The Pipe Sections Table lists the Starting and Ending pipe section numbers in the entire pipe network.

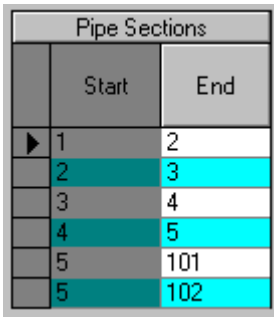
Pipe Section Start



Pipe Sections		
	Start	End
▶	1	2
	2	3
	3	4
	4	5
	5	101
	5	102

The Pipe Section Start column shows the section number of the pipe section start point. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

Pipe Section End



Pipe Sections		
	Start	End
▶	1	2
	2	3
	3	4
	4	5
	5	101
	5	102

The Pipe Section End column shows the section number of the pipe section end point. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

Pipe Network Inputs Table

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The Pipe Network Input Table contains all of the information that is input to the Flow Calculation routine. Nearly every field is editable, the exceptions being those fields that would affect the overall pipe section numbering.

Pipe Section Length

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The Pipe Section Length column shows the actual length of pipe in the pipe section. Click on this cell to edit the value. Pipe lengths must be greater than zero, and cannot be less than the Elevation Change.

Elevation Change

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The Elevation Change column shows the overall elevation change of the pipe section. Pipes whose flow will be in the up direction will be considered a positive elevation change. Pipes whose flow will be in the down direction will be considered a negative elevation change. The sum of all elevation changes in the pipe section will be displayed. Click on this cell to edit the value. Elevation changes must be less than or equal to the Pipe Length.

Pipe Diameter

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The Pipe Diameter column shows the diameter of the pipe in the section. To specify a pipe diameter, click on this cell and select a value from the dropdown list. Sections that end with a nozzle will be limited to pipe diameters that are equivalent to available nozzle diameters. Select 'Auto Pick' if you want the flow calculation routine to pick the Pipe Diameter for you.

Pipe Schedule

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The Pipe Schedule column shows the schedule of the pipe in the section. To specify a pipe schedule, click on this cell and select a value from the dropdown list. Select 'Auto Pick' if you want the flow calculation routine to pick the Pipe Schedule for you.

90° Elbows

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The 90° Elbow column shows the number of elbows contained in the pipe section. Click on this cell to edit the value. The number of 90° elbows must be greater than or equal to zero.

Thru Tee Branch

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

The Thru Tee Branch column shows the number of thru tee branches in the pipe section. A branch is considered a thru branch if there is no change in the direction of flow through this portion of the tee. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

Side Tee Branch

Pipe Network Inputs						
Pipe Length	Elevation Change	Selected Pipe Diameter	Selected Pipe Schedule	90° Elbows	Thru Tee Branch	Side Tee Branch
1.34 m	1.34 m	50 mm	SCH 40 T			
0.47 m	0.15 m	50 mm	SCH 40 T	1		
1.50 m	1.50 m	50 mm	SCH 40 T			1
3.00 m		Auto Pick	Auto Pick	1		
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1
3.50 m	-0.50 m	Auto Pick	Auto Pick	1		1

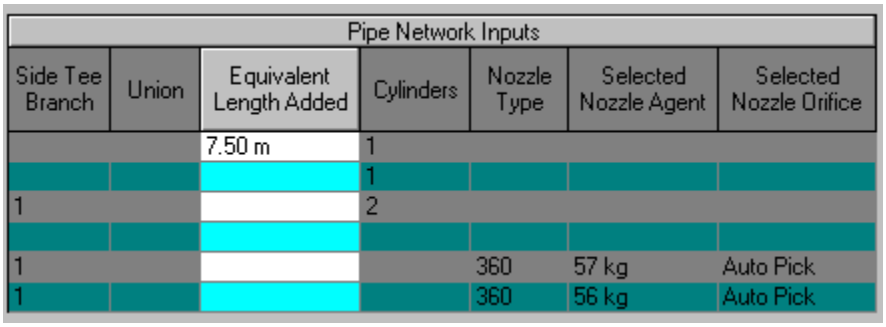
The Side Tee Branch column shows the number of side tee branches in the pipe section. A branch is considered a side branch if there is a change in the direction of flow though this portion of the tee. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

Unions / Couplings

Pipe Network Inputs						
Side Tee Branch	Union	Equivalent Length Added	Cylinders	Nozzle Type	Selected Nozzle Agent	Selected Nozzle Orifice
		7.50 m	1			
			1			
1			2			
1				360	57 kg	Auto Pick
1				360	56 kg	Auto Pick

The Union column shows the number of unions or couplings in the pipe section. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

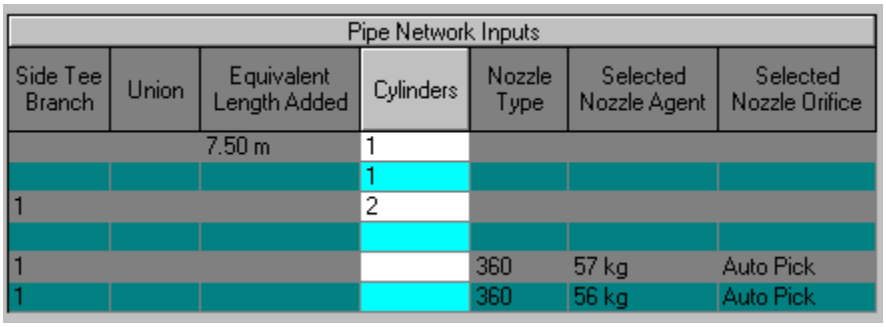
Equivalent Length Added



Pipe Network Inputs						
Side Tee Branch	Union	Equivalent Length Added	Cylinders	Nozzle Type	Selected Nozzle Agent	Selected Nozzle Orifice
		7.50 m	1			
			1			
1			2			
1				360	57 kg	Auto Pick
1				360	56 kg	Auto Pick

The Equivalent Length Added column shows the added equivalent length introduced into this pipe section. Click on this cell to edit the value. Equivalent Length added must be greater than or equal to zero and the section Pipe Diameter must be specified if this field is non zero.

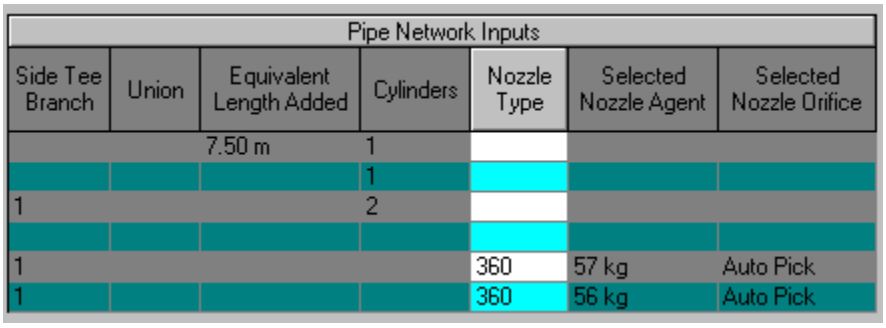
Cylinders



Pipe Network Inputs						
Side Tee Branch	Union	Equivalent Length Added	Cylinders	Nozzle Type	Selected Nozzle Agent	Selected Nozzle Orifice
		7.50 m	1			
			1			
1			2			
1				360	57 kg	Auto Pick
1				360	56 kg	Auto Pick

The Cylinders column shows the number of cylinders that are flowing through this manifold section of pipe. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

Nozzle Type



Pipe Network Inputs						
Side Tee Branch	Union	Equivalent Length Added	Cylinders	Nozzle Type	Selected Nozzle Agent	Selected Nozzle Orifice
		7.50 m	1			
			1			
1			2			
1				360	57 kg	Auto Pick
1				360	56 kg	Auto Pick

The Nozzle Type column shows the type of nozzle selected for this section. This value cannot be edited and is pulled directly from the Pipe Network Layout screen.

Selected Nozzle Agent

Pipe Network Inputs						
Side Tee Branch	Union	Equivalent Length Added	Cylinders	Nozzle Type	Selected Nozzle Agent	Selected Nozzle Orifice
		7.50 m	1			
			1			
1			2			
1				360	57 kg	Auto Pick
1				360	56 kg	Auto Pick

The Selected Nozzle Agent column shows how much agent is requested to be discharged from each nozzle. Click on this cell to edit the quantity of agent. The sum of the Selected Nozzle Agent must equal the Total Stored Agent in the cylinder(s).

Selected Nozzle Orifice

Pipe Network Inputs						
Side Tee Branch	Union	Equivalent Length Added	Cylinders	Nozzle Type	Selected Nozzle Agent	Selected Nozzle Orifice
		7.50 m	1			
			1			
1			2			
1				360	57 kg	Auto Pick
1				360	56 kg	Auto Pick

The Selected Nozzle Orifice column shows the requested nozzle orifice diameter. Click on this cell to select a nozzle orifice diameter from the dropdown list. Choose 'Auto Pick' to have the flow calculation routine choose the nozzle orifice diameter for you.

If any nozzles have an orifice diameter specified, you must specify all pipe diameters and pipe schedules in the pipe network. You must also specify an orifice diameter for every nozzle in the pipe network.

Flow Calculation Results

Flow Calculation Results				
Pipe Type	Equivalent Length	Start Pressure	End Pressure	Agent Flow Rate
2 -SCH 40	8.84 m	1910 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	2.05 m	1889 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	4.65 m	1889 kPa	1827 kPa	12.4 kg/s
1 1/4-SCH 40	4.05 m	1827 kPa	1538 kPa	12.4 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1475 kPa	6.2 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1469 kPa	6.2 kg/s

The Flow Calculation Results table shows the calculated data after a flow calculation has been successfully completed.

Pipe Type

Flow Calculation Results				
Pipe Type	Equivalent Length	Start Pressure	End Pressure	Agent Flow Rate
2 -SCH 40	8.84 m	1910 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	2.05 m	1889 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	4.65 m	1889 kPa	1827 kPa	12.4 kg/s
1 1/4-SCH 40	4.05 m	1827 kPa	1538 kPa	12.4 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1475 kPa	6.2 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1469 kPa	6.2 kg/s

The Pipe Type column shows the calculated values of the pipe diameter and schedule for each pipe section.

Equivalent Length

Flow Calculation Results				
Pipe Type	Equivalent Length	Start Pressure	End Pressure	Agent Flow Rate
2 -SCH 40	8.84 m	1910 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	2.05 m	1889 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	4.65 m	1889 kPa	1827 kPa	12.4 kg/s
1 1/4-SCH 40	4.05 m	1827 kPa	1538 kPa	12.4 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1475 kPa	6.2 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1469 kPa	6.2 kg/s

The Equivalent Length column shows the calculated equivalent length for the entire pipe section.

Start Pressure

Flow Calculation Results				
Pipe Type	Equivalent Length	Start Pressure	End Pressure	Agent Flow Rate
2 -SCH 40	8.84 m	1910 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	2.05 m	1889 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	4.65 m	1889 kPa	1827 kPa	12.4 kg/s
1 1/4-SCH 40	4.05 m	1827 kPa	1538 kPa	12.4 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1475 kPa	6.2 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1469 kPa	6.2 kg/s

The Start Pressure column shows the calculated pressure at the start point of the pipe section.

End Pressure

Flow Calculation Results				
Pipe Type	Equivalent Length	Start Pressure	End Pressure	Agent Flow Rate
2 -SCH 40	8.84 m	1910 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	2.05 m	1889 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	4.65 m	1889 kPa	1827 kPa	12.4 kg/s
1 1/4-SCH 40	4.05 m	1827 kPa	1538 kPa	12.4 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1475 kPa	6.2 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1469 kPa	6.2 kg/s

The End Pressure column shows the calculated pressure at the end point of the pipe section.

Agent Flow Rate

Flow Calculation Results				
Pipe Type	Equivalent Length	Start Pressure	End Pressure	Agent Flow Rate
2 -SCH 40	8.84 m	1910 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	2.05 m	1889 kPa	1889 kPa	6.2 kg/s
2 -SCH 40	4.65 m	1889 kPa	1827 kPa	12.4 kg/s
1 1/4-SCH 40	4.05 m	1827 kPa	1538 kPa	12.4 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1475 kPa	6.2 kg/s
1 1/4-SCH 40	6.65 m	1538 kPa	1469 kPa	6.2 kg/s

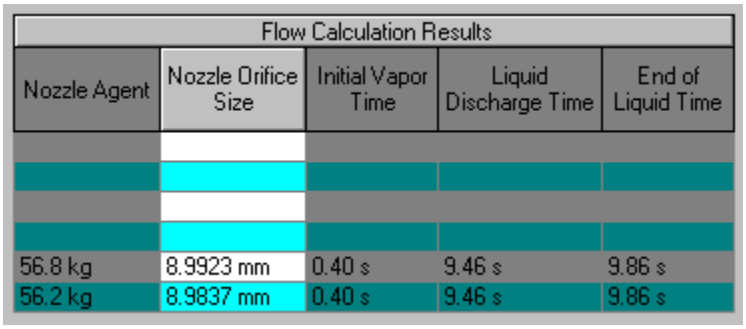
The Agent Flow Rate field shows the calculated flow rate of clean agent through this pipe section.

Nozzle Agent

Flow Calculation Results				
Nozzle Agent	Nozzle Orifice Size	Initial Vapor Time	Liquid Discharge Time	End of Liquid Time
56.8 kg	8.9923 mm	0.40 s	9.46 s	9.86 s
56.2 kg	8.9837 mm	0.40 s	9.46 s	9.86 s

The Nozzle Agent column shows the calculated amount of clean agent that should be discharged from this nozzle.

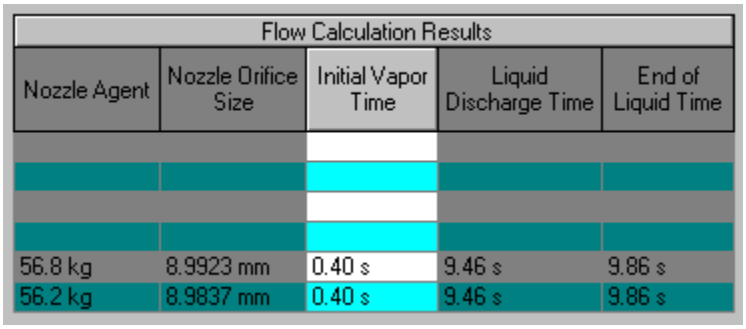
Nozzle Orifice Size



Flow Calculation Results				
Nozzle Agent	Nozzle Orifice Size	Initial Vapor Time	Liquid Discharge Time	End of Liquid Time
56.8 kg	8.9923 mm	0.40 s	9.46 s	9.86 s
56.2 kg	8.9837 mm	0.40 s	9.46 s	9.86 s

The Nozzle Orifice Size field shows the calculated drill diameter for the holes in this nozzle.

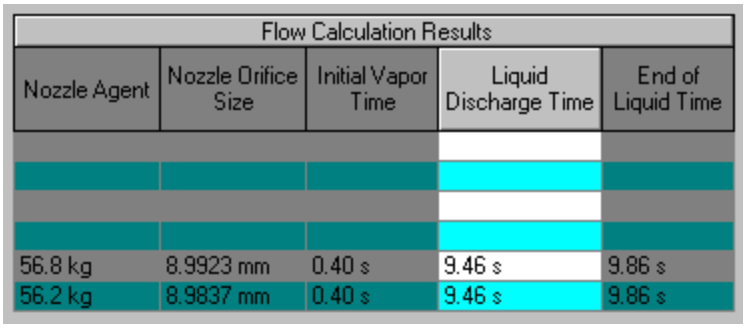
Initial Vapor Time



Flow Calculation Results				
Nozzle Agent	Nozzle Orifice Size	Initial Vapor Time	Liquid Discharge Time	End of Liquid Time
56.8 kg	8.9923 mm	0.40 s	9.46 s	9.86 s
56.2 kg	8.9837 mm	0.40 s	9.46 s	9.86 s

The Initial Vapor Time field shows the calculated amount of time it should take from initial discharge to the time liquid will start flowing from the nozzle. During this time there will be only vapor discharged at the nozzle.

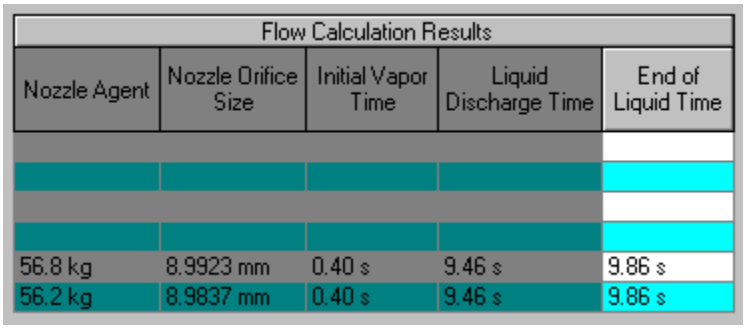
Liquid Discharge Time



Flow Calculation Results				
Nozzle Agent	Nozzle Orifice Size	Initial Vapor Time	Liquid Discharge Time	End of Liquid Time
56.8 kg	8.9923 mm	0.40 s	9.46 s	9.86 s
56.2 kg	8.9837 mm	0.40 s	9.46 s	9.86 s

The Liquid Discharge Time field shows the calculated amount of time it will take for the entire liquid clean agent to be discharged from the nozzle.

End of Liquid Time



Flow Calculation Results				
Nozzle Agent	Nozzle Orifice Size	Initial Vapor Time	Liquid Discharge Time	End of Liquid Time
56.8 kg	8.9923 mm	0.40 s	9.46 s	9.86 s
56.2 kg	8.9837 mm	0.40 s	9.46 s	9.86 s

The End of Liquid Time field shows the calculated amount of time it will take from initial discharge to the time all liquid will be discharged from the nozzle.

Calculation Message

This tab will display any messages produced during the flow calculation process.

Print Project

The Print Project screen allows you to preview and print a report with details of your project. Each page contains different information ranging from Enclosure definition to the System Acceptance report. The report can be viewed at any time, and only information that has been entered or calculated will be displayed.

Print Preview Toolbar

The Print Preview Toolbar has functions for page navigation, page size and orientation, and output generation.

First Page

The First Page button changes the Print Preview to show the first page of the report.

Previous Page

The Previous Page button changes the Print Preview to show the previous page.

Next Page

The Next Page button changes the Print Preview to show the next page.

Last Page

The Last Page button changes the Print Preview to show the last page of the report.

Zoom In

The Zoom In button changes the Print Preview to show a larger view of the current page.

Zoom Out

The Zoom Out button changes the Print Preview to show a smaller view of the current page.

Zoom All – Menu Button

The Zoom All button by default will change the Print Preview to show the entire page at one time. Alternatively, you may use the menu portion of the button to view the page in one of several predefined sizes.

Setup Page

The Setup Page button allows you to change the format of the page you are working with. You will also have access to the printer property information. The Print Preview will be regenerated using the new page parameters.

Print Page

The Print Page button allows you to print the entire report or a range of pages. The default printer is shown, and you may select any available printer. Click OK to print the pages or CANCEL to exit the dialog box without printing.

PDF Save

The PDF Save button allows you to save all of the pages into an Adobe ® PDF file. You will be prompted to enter a filename to save the report.

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