PIPENET NEWS™

SUNRISE

WELCOME TO PIPENET NEWS

IN THIS ISSUE...

Service Pack Available Now

PIPENET Vision 1.8.1 - is the latest version of PIPENET. From today the service pack, PIPENET Vision 1.8.1 is available to download from our website www.sunrise-sys.com/register for registered customers with valid Maintenance, Updates and Support.

Check you are already using PIPENET VISION 1.8.0 and be ready to upgrade.

Simplified Design & Analysis in PIPENET Spray/Sprinkler

Page 7

The PIPENET design and analysis dialog box is easier to use!

Making Best Use Of Accumulators

Page 8

Accumulators are widely used to reduce pressure surge. In PIPENET Vision 1.8.0 there are two accumulator types.

Applications Of The Diaphragm Accumulator in PIPENET

Page 2

NEWS… PIPENET Vision 1.8.1 is out now!

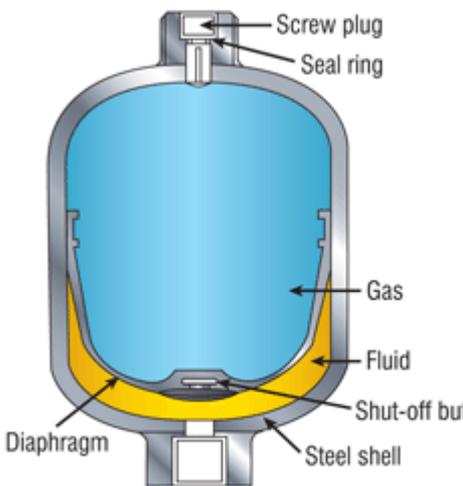# Applications of Diaphragm Accumulator In PIPENET

The original accumulator model (simple type) in PIPENET did not have a diaphragm to contain gas medium. This structure is usually used in large tanks.


Generally an simple type accumulator does not allow draining because it is an undesirable for gas to escape to the network. PIPENET will terminate the calculation automatically if this happens.

Some accumulators can't drain because gas is sealed in a diaphragm. PIPENET VISION 1.8.0 Transient Module enhances the existing model by introducing the diaphragm type accumulator.

In some cases, the diaphragm accumulator is used to model dead-ends in a dry deluge system. This ensures the calculation continues smoothly where the simple accumulator is used with network dead-ends. This makes modelling in PIPENET even more flexible.

Diaphragm Accumulator

## PIPENET - Leading The Way In Fluid Flow Analysis
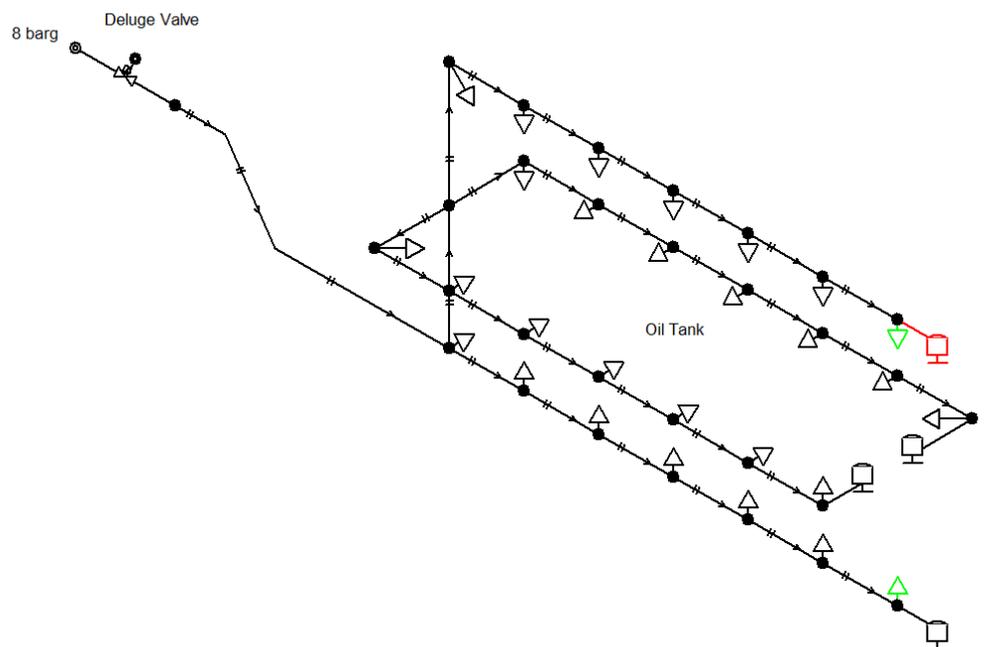
Autosave In PIPENET

It is good practice to save your work frequently as you work. This can be done automatically after you have saved it to the location of your choice for the first time.

Autosave is a feature that can be used to automatically save your edits and modifications periodically. Select this option to set the interval, in minutes, at which the network is to be automatically saved. The default is zero, indicating that the Autosave feature is disabled.

Step 1 - Manually save your file in the folder of your choice

Step 2 - Select 'File' and then, 'Autosave'. The AutoSave dialog can be found in **File | Autosave...**
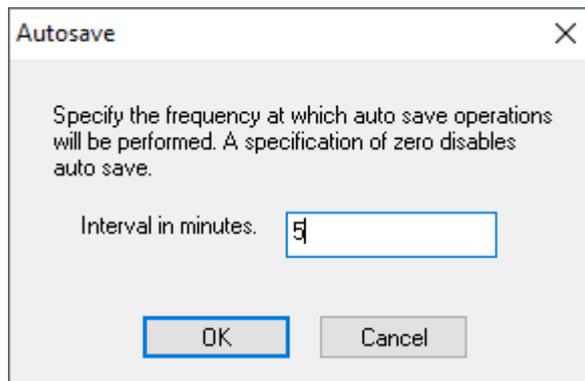
Please also note that if you wish to save the data for a scenario, you will need to change the file name. Otherwise your
 data will be overwritten.

Use 'Autosave' and enjoy the peace of mind that your data will be saved frequently.

PIPENET - Leading The Way In Fluid Flow Analysis

Modelling Foam Concentrate Systems In PIPENET Spray/Sprinkler

NFPA 16: Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems 2011 specifies the following rules for hydraulic calculations for foam systems:

"7.4 Hydraulic Calculations

7.4.1 Foam-Water Deluge Systems.

7.4.1.3 Hydraulic calculations for piping carrying water or the foam solution shall be in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.

7.4.1.3.1 Piping carrying foam solution shall be sized as if carrying plain water.

7.4.1.4* The friction losses in piping carrying foam concentrate shall be calculated using the Darcy-Weisbach formula."

Performing a PIPENET calculation, whilst following these rules, is simple. The procedure to follow is described below.

Foam Solution System: This is a system in which the foam concentrate is already mixed with water. According to the NFPA rules, this should be treated just like water. In other words, the Hazen-Williams equation should be used for calculating the frictional pressure loss in pipes. The density and viscosity of water are built into the Hazen–Williams equation and so the frictional pressure loss will not change. If you changed the density of the fluid it will only affect the static head loss/gain.
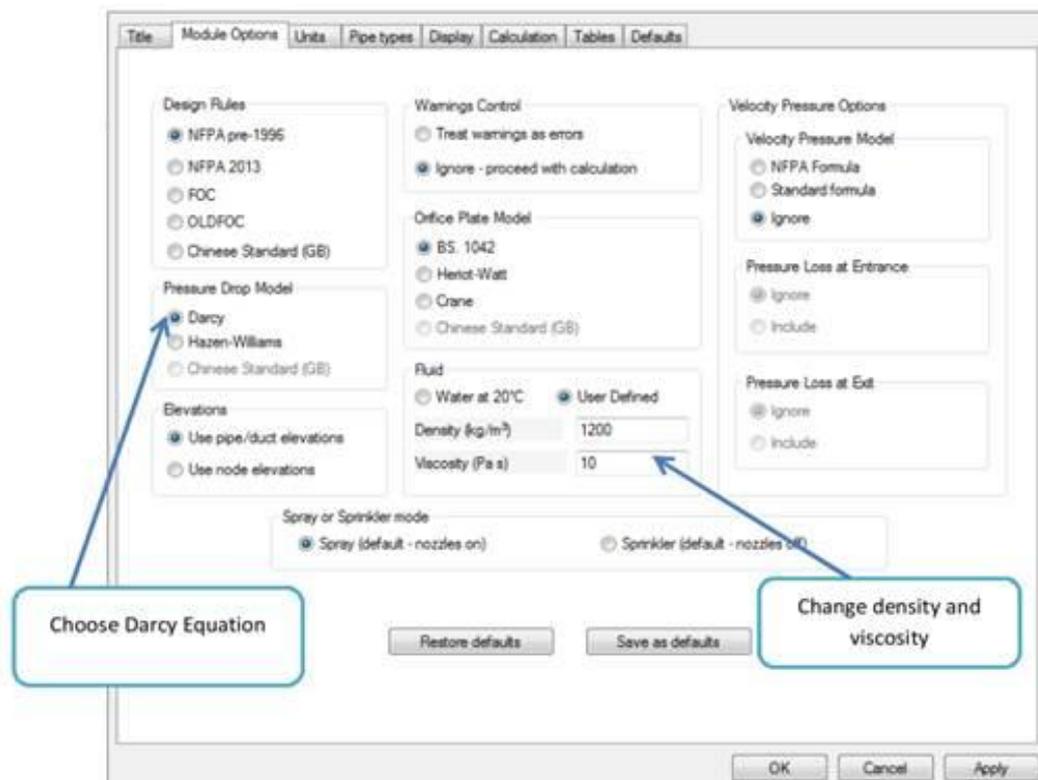
The Darcy equation uses the actual density and viscosity in calculating the frictional pressure loss.

Modelling Foam Concentrate Systems In PIPENET Spray/Sprinkler Continued

Foam Concentrate System: Typically a foam concentrate system is modelled on its own, and not as part of a firewater ringmain, because the density and viscosity are different from those of water. According to the NFPA rules, the Darcy Weisbach equation must be used for calculating the frictional pressure loss. So (a) you should input the pipes for the foam concentrate on their own and not as part of the firewater ringmain and (b) you should select the Darcy option and input the density and viscosity as sown below:

Frequently asked questions

Degeneration Factor in Pump Curves

If you are using a quadratic curve to model your simple pump, that curve will, in general, only apply to the specified working range of the pump. The performance of the pump outside this range depends on the motor characteristics and the effect of other factors. Degeneration factors can be used to specify the behaviour of the curve below and/or above the specified working range in PIPENET.

The degeneration factor, is an integer in the range 0 to 10. When the degeneration exponent is zero (i.e., no degeneration), the equation becomes tangential to the normal quadratic curve.

Below the minimum flow rate :

The larger the value of n, the flatter of the pump curve is below the minimum flowrate.

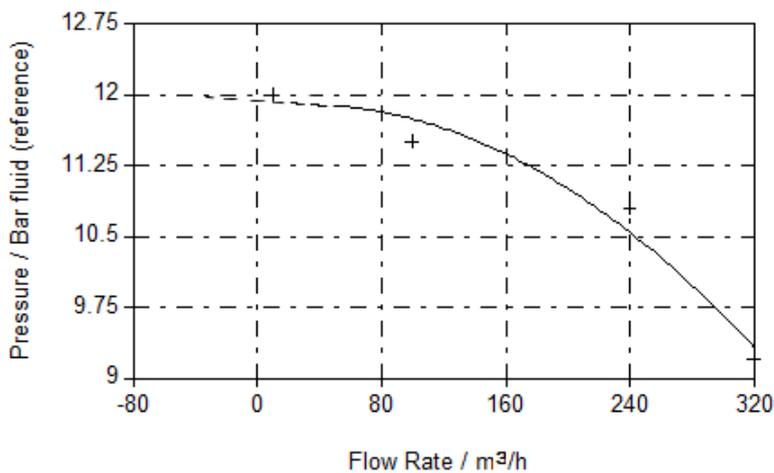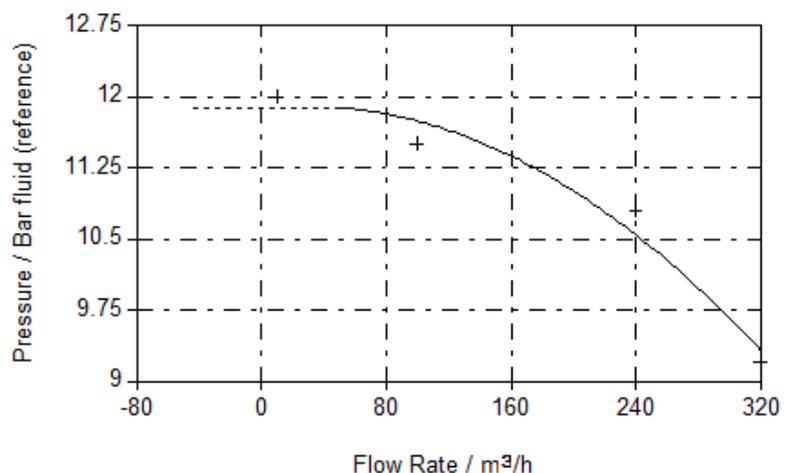The following graphs show the degeneration factor of 0 and 10.
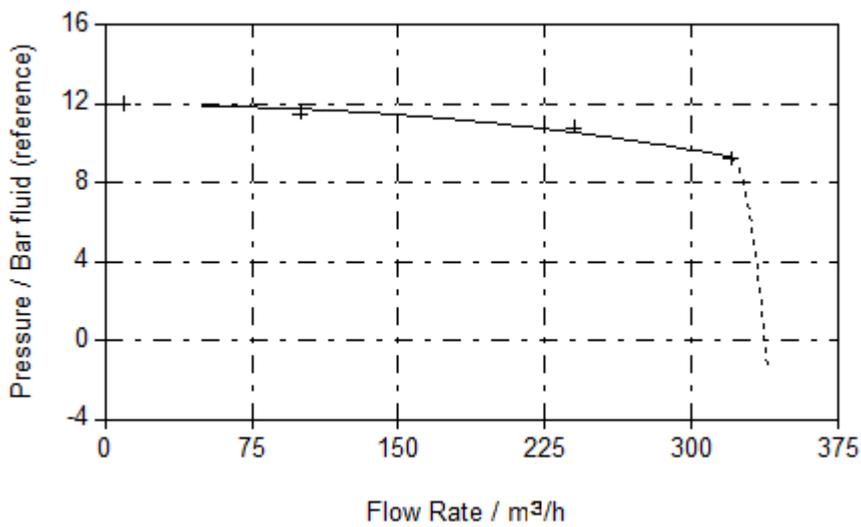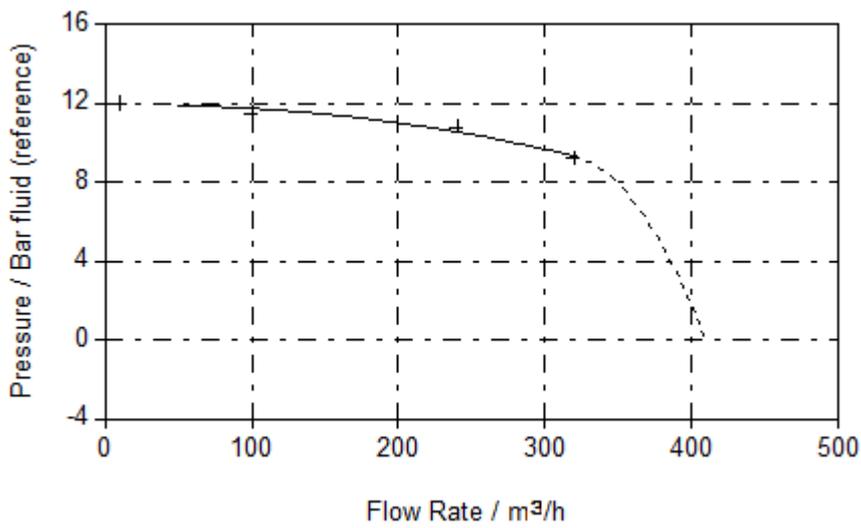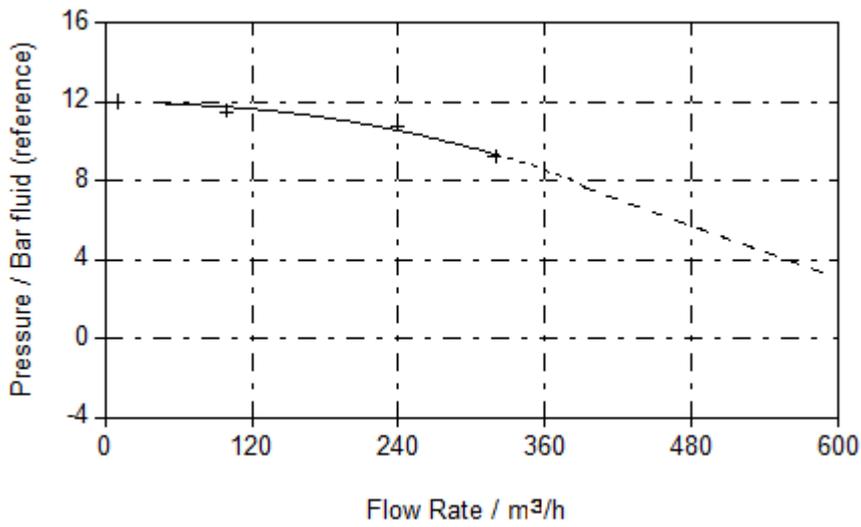

Figure 1 Degenerationfactor = 0.

Figure 2Below - Degeneration factor = 10.

The maximum flow rate:

The larger the degeneration factor, the quicker the pump curve degenerates, i.e. pump head drops largely with flowrate increase.
The following graphs show the degeneration factor of 0, 5 and 10.

PIPENET - Leading The Way In Fluid Flow Analysis

6

Simplified Design & Analysis in Spray/Sprinkler Module

PIPENET VISION 1.8.0 introduced a simplification to the design/analysis dialog box and tools which makes it much more flexible and easier to use. It is no longer necessary to input both design and analysis specifications when they are not both required. In previous versions, it was necessary to perform the design phase for every calculation as the results from this phase were used to provide a starting point for the analysis phase calculation. PIPENET VISION 1.8.0 uses an improved algorithm and no longer requires the design phase results in order to perform the analysis phase.

The user can chose between only the analysis phase, only the design phase, or both phases in Options | Calculation Options.
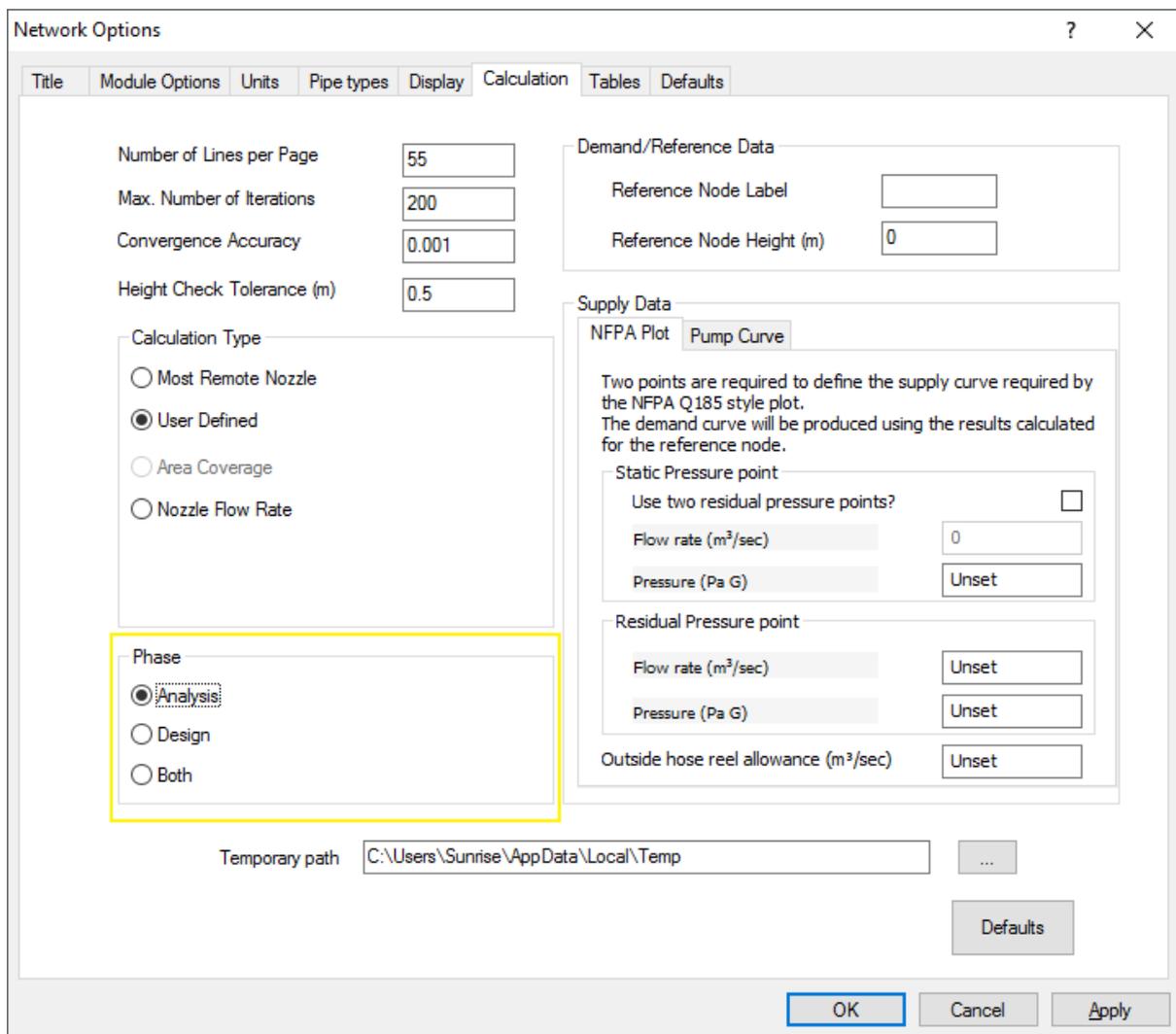
They can also be quickly switched between on the calculation toolbar in the main view. Select "A" for only the analysis phase, "D" for only the design phase or "B" for both phases.

The sequence of operations will typically proceed as follows:

1. The user chooses whether to perform only the analysis phase, the design phase or both phases.

Simplified Design & Analysis in Spray/Sprinkler Module Continued

2. The user enters the network and if he/she requires that PIPENET performs a Design phase then pipes may be entered with undefined bores.

3. When the user has entered the network they will select the design phase and click the pipe sizing button to size the undefined pipes. The calculated pipe sizes are returned to the user, where they are displayed along with other pipe attributes; however, if another pipe sizing operation is performed, the sizes may change if changes are made to the network.

4. Steps 2 and 3 are repeated as required.

5. When the user is happy with the network, they select the Analysis button to fix the designed pipe sizes, and then perform a calculation.

6. The user can revert to the design phase by selecting the Design button. However, the bores of pipes fixed in step 5 do not become unset.

Note that files created in older versions of PIPENET will have both phases activated by default when opened in PIPENET 1.8.0. If the design phase is not required it can be deactivated by simply selecting "A" on the calculation toolbar.

The phase selection is preserved when the PIPENET file is saved so it will be the same next time it is opened.

Accumulators In PIPENET

Accumulators are placed in systems in order to reduce pressure surges. They consist of a sealed cylindrical vessel connected to the network at one point. The trapped gas in the accumulator provides a cushioning effect, which reduces pressure surges. The accumulator is usually a cost-effective way of reducing a pressure surge, as it is cheap, reliable and easy to maintain. However, it is important to note that often they need to be large in order to be effective.

The sizing of the accumulator is crucial, as incorrectly sized accumulators can actually increase pressure surges in other parts of the network.

From 1.8.0, there are two accumulator types: Simple and Diaphragm. The diaphragm accumulator has a flexible membrane to separate liquid from gas in the upper part of the vessel. The gas is sealed in the membrane and may fill the whole accumulator to the maximum. On the contrary, there is no such a membrane in the simple. Therefore, the simple may completely drain as the pressure at its entry decreases. The PIPENET simulation will terminate in this case.
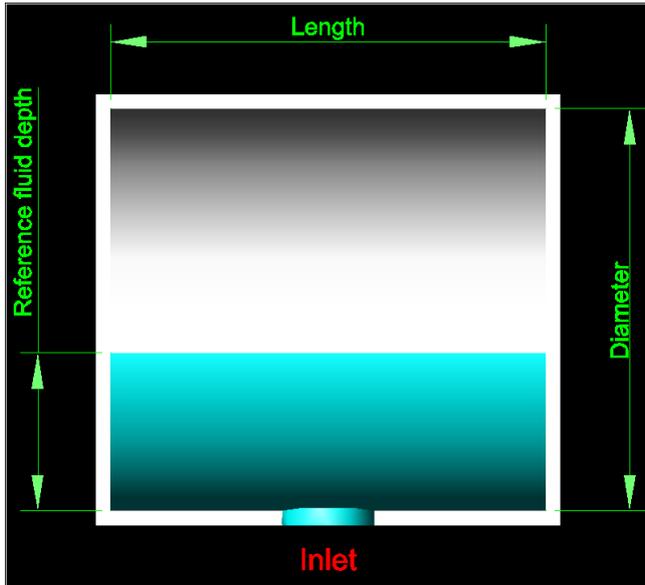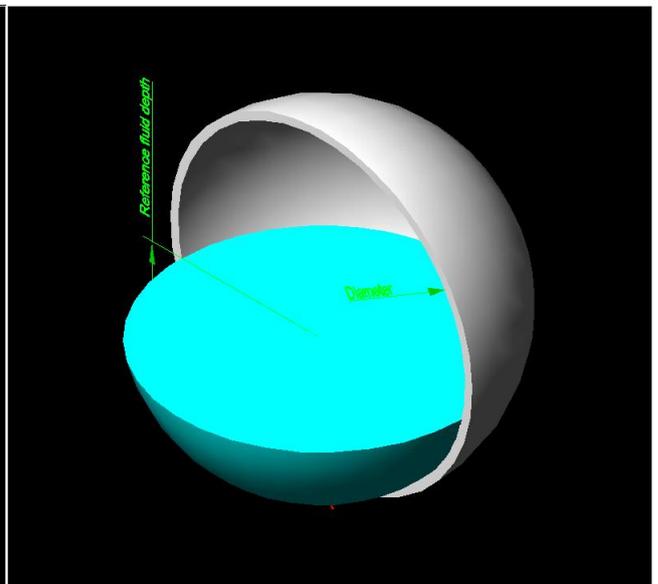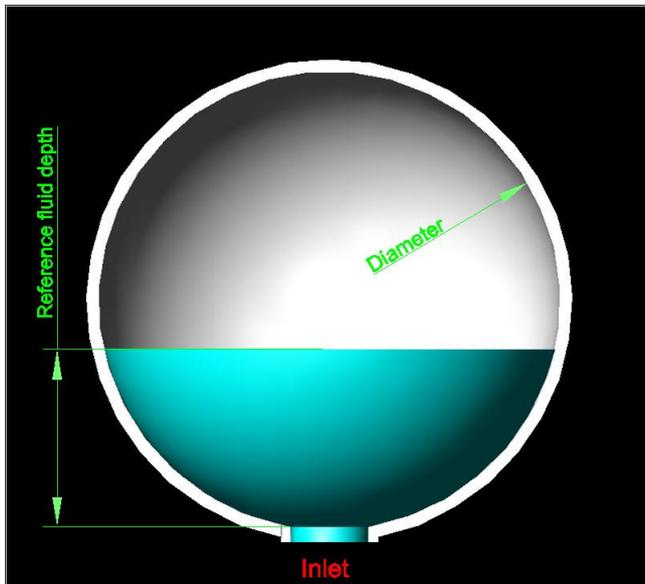
Horizontal Cylinder Accumulator
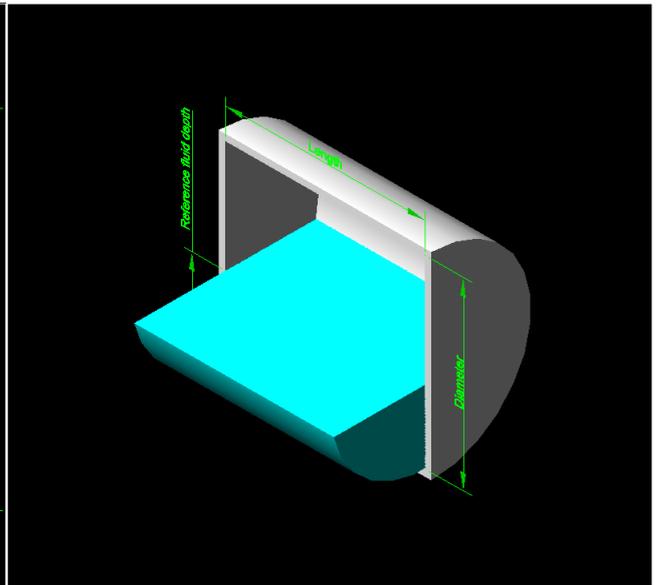
Vertical Cylinder Accumulator
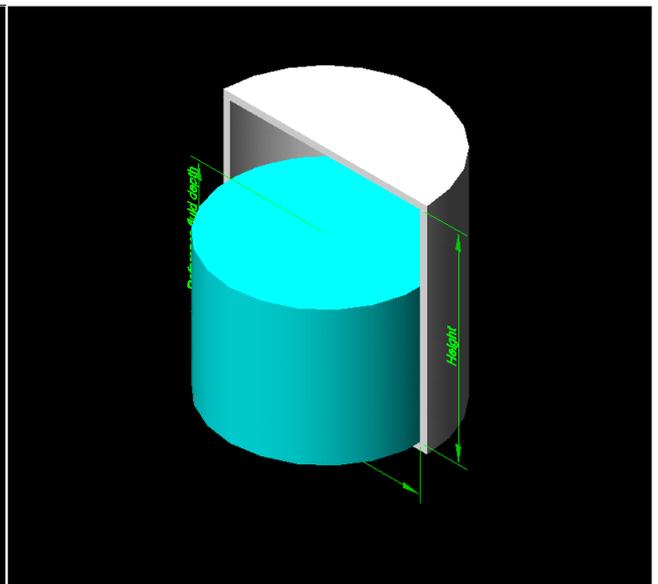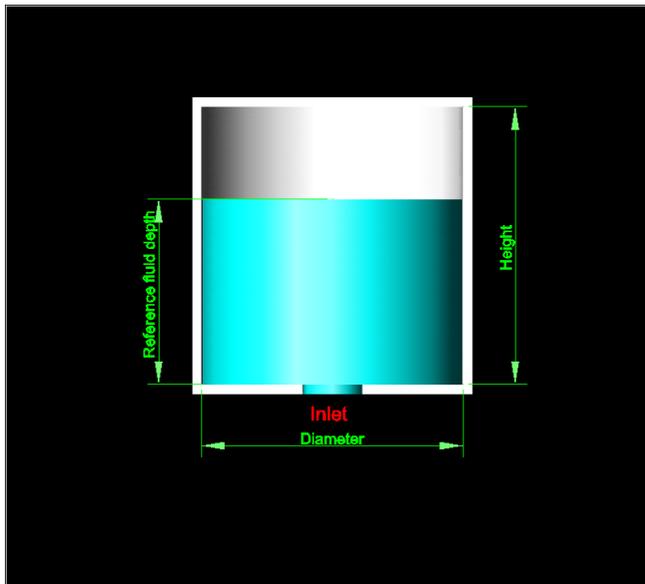
Spherical Accumulator

User Input Parameters

1. Type – Simple or Diaphragm.

2. Vessel Shape – Vertical cylinder (default), Horizontal cylinder, Sphere, user-defined type.

3. Dimension – diameter and height for vertical cylinder; diameter and length for horizontal cylinder; diameter only for sphere accumulator, defined in tank library for user-defined type.

4. Reference fluid depth.

5. Reference gas – monatomic gas (He, Ne, Ar, Xe, Kr, etc), diatomic gas (Air, H2, N2, O2, CO, NO, etc), triatomic gas (Steam, CO2, N2O, SO2, etc) or user-defined.

6. Heat capacity ratio –

    Monatomic gas = 1.66 (grayed out).

    Diatomic gas = 1.4 (grayed out).

    Triatomic gas = 1.33 (grayed out).

    User-defined ≥ 1 (enabled).

7. Reference gas temperature.

8. Reference gas pressure.

Reference gas characteristics

The reference gas is selected as one of the following (diatomic gas being the default):-

Gas type	Heat capacity ratio
Monatomic gas - He, Ne, Ar, Xe, Kr, etc.	1.66
Diatomic gas - Air, H2, N2, O2, NO, etc.	1.40
Triatomic gas - Steam, CO2, N2O, SO2, etc.	1.33
User-defined	Specified by user as ≥ 1.0

Note

1. All heat capacity ratios listed are based on atmospheric conditions.

2. The heat capacity ratio of a triatomic gas is set as 1.33. The actual value is in the range 1.29 to 1.33, because of its asymmetrical molecular structure. For example, Steam = 1.33, CO_2= 1.30, N_2O = 1.31 and SO_2 = 1.29.

Am I using the latest version of PIPENET?

PIPENET Vision 1.8.1

We strongly recommend customers to use the latest version of PIPENET at all times to ensure you have all of the latest features. With more than 150 new features in PIPENET Vision 1.8.0 there's a lot of additional functionality to enjoy in the Standard and Transient modules as well as PIPENET Spray/Sprinkler module.

PIPENET Vision 1.8.0 released in April 2016, is an excellent release with a very few bug fixes required. These have been included in PIPENET Vision 1.8.1, making PIPENET Vision 1.8 even better!

The PIPENET graph viewer has been enhanced too.

To check which version you are using, please:

i)   Open PIPENET

ii)   Select Help

iii)   Select 'About PIPENET'

You will now see a picture screen. The version number can be seen in the top right hand corner.

If you are not using, PIPENET Vision 1.8.0 or PIPENET Vision 1.8.0, please contact your IT Department

or us – pipenet@sunrise-sys.com to upgrade to PIPENET Vision 1.8.1

When you have upgraded to PIPENET Vision 1.8.0,

please register on our website to upgrade to PIPENET Vision 1.8.1, selecting software update

 from the drop down menu. We will contact you soon after with information on how to download the service

pack, PIPENET Vision 1.8.1

PIPENET - Contact us: pipenet@sunrise-sys.com

PIPENET - Leading The Way In Fluid Flow Analysis