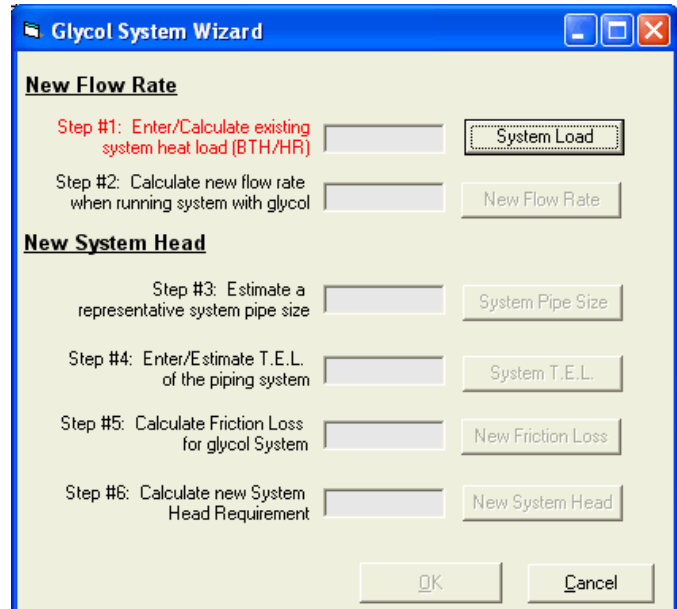


Using the Glycol Wizard

At some point, you probably had to convert a hydronic system that was designed for water over to glycol. Designing a new system using glycol is pretty straightforward because you know all the design information. For an existing system, where you may not have the plans or the resources to go back and lay it out, you will need to rely on some ingenuity and estimating. To help, ESP-PLUS® has a built-in Glycol Wizard.

The icon for the wizard is located on the main pump screen (stand-alone version only) – it's a G inside a circle.

Let's use an example system of 1000 GPM at 100 feet. This flow and head were originally calculated using water as the heating medium. The first step is to enter the system heating/cooling load.

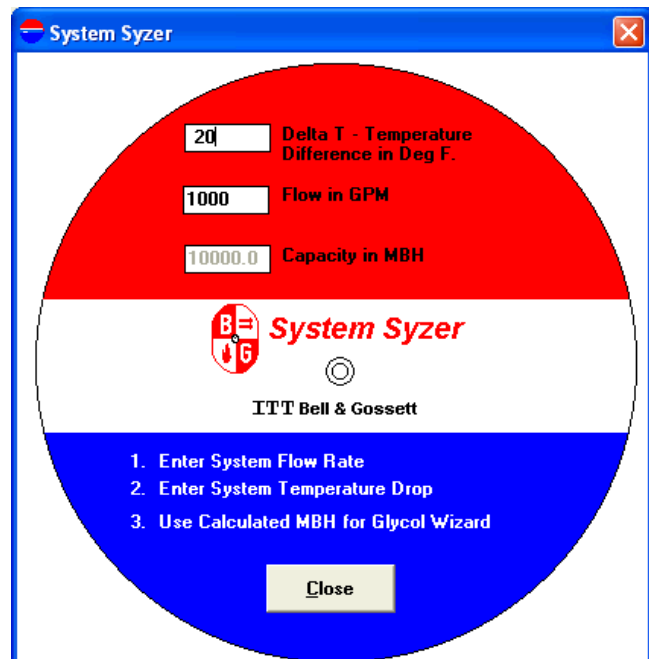


The screenshot shows the 'Glycol System Wizard' dialog box. It is divided into two main sections: 'New Flow Rate' and 'New System Head'.
New Flow Rate:
Step #1: Enter/Calculate existing system heat load (BTH/HR) with a text input field and a 'System Load' button.
Step #2: Calculate new flow rate when running system with glycol with a text input field and a 'New Flow Rate' button.
New System Head:
Step #3: Estimate a representative system pipe size with a text input field and a 'System Pipe Size' button.
Step #4: Enter/Estimate T.E.L. of the piping system with a text input field and a 'System T.E.L.' button.
Step #5: Calculate Friction Loss for glycol System with a text input field and a 'New Friction Loss' button.
Step #6: Calculate new System Head Requirement with a text input field and a 'New System Head' button.
At the bottom right, there are 'OK' and 'Cancel' buttons.

If you don't know the heating load, you can use the System Syzer tool built into the wizard.

You will enter the original flow rate based on water.

You must also enter a temperature drop (or rise). Typically, it will be 20 Deg F.



The screenshot shows the 'System Syzer' dialog box. It features a large circular graphic with a red top half and a blue bottom half. The red half contains three input fields: '20' for 'Delta T - Temperature Difference in Deg F.', '1000' for 'Flow in GPM', and '10000.0' for 'Capacity in MBH'. The blue half contains the 'System Syzer' logo (a circle with 'B' and 'G' inside), the text 'ITT Bell & Gossett', and a numbered list:
1. Enter System Flow Rate
2. Enter System Temperature Drop
3. Use Calculated MBH for Glycol Wizard
A 'Close' button is located at the bottom center of the dialog.

Since glycol cannot carry as much heat as water, the next step is to calculate the new flow rate by keeping the system load and temp drop constant.

To help, ESP uses the heat balance tool borrowed from the Steam Station module.

Here, the new flow rate required to meet the heating/cooling load is 1012 GPM.

The Fluid Calculator window shows the following input and output values:

Heat Load (held constant):	10000000		
Fluid:	Propylene Glycol		
Glycol Percent:	20	SG:	1.01717059
Inlet Temperature:	45 °F	SV:	2.57253356
Outlet Temperature:	65 °F	SH:	0.97091233
Flow Rate:	1012.5 gpm	COND:	0.297525

Buttons: Calculate New Flow Rate, Close

Instructions:

1. Enter your new system fluid
2. Enter system temperatures (Use same temperature drop used in previous step to determine load)
3. Calculate new require flow rate

The next step is to determine the *representative* system pipe size. We do that by entering the water flow rate and pick a pipe size with a reasonable friction loss. Note you will want to keep it to the high side of the velocity limit – it’s only representative.

Again, the System Syzer is used to help.

The System Syzer window displays the following parameters:

- Flow in GPM: 1000
- Pipe Size: 6 in
- Pipe Material: Steel Pipe
- 60 Deg F. Water
- Friction Loss ft. per 100 FT. of Pipe: 6.19
- Velocity Feet per Second: 11.11

Buttons: OK, Cancel

Using the friction loss from the step above and the original pump TDH, the system TEL can be estimated.

The System Syzer window displays the following calculated results:

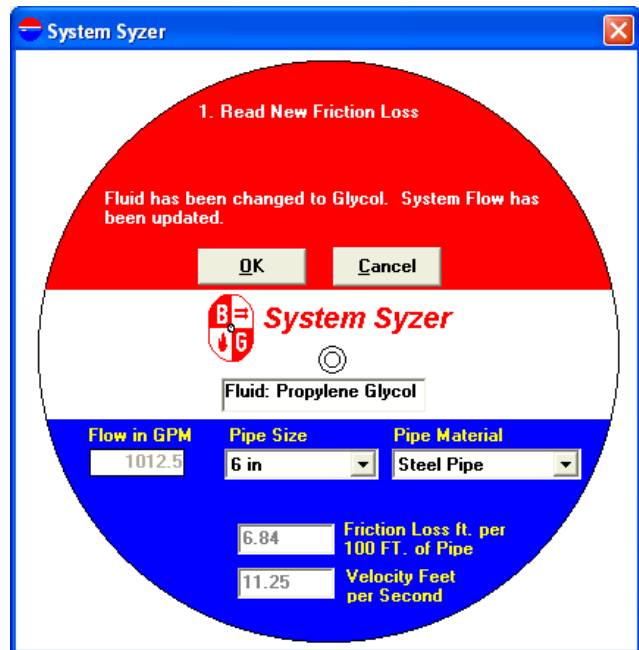
- Pipe Length in Feet: 1615.5
- Friction loss in feet per 100 feet of pip: 6.19
- Total Pressure Drop of Water System in Feet: 100

Buttons: Close

Instructions:

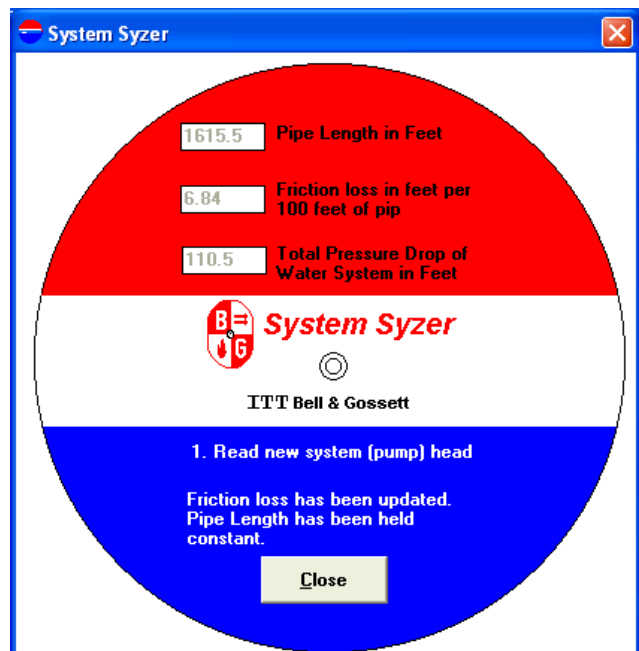
1. Enter System Pressure drop based on water (pump head)
2. Read Total Equivalent Length of the piping system

Now we calculate the new friction loss using the glycol fluid.



Using the new friction loss with the constant system TEL, we can estimate the new pump TDH requirement.

So, our system requirements for glycol solution system are 1012 GPM at 110 feet.



We can then plug in the new flow and new head, and have ESP-PLUS select a pump using the viscous fluid. ESP-PLUS will graph the pump showing the performance curve based on water (blue curve) and the corrected performance curve (green curve) – in this case they overlap. The pump efficiency and HP curves shown are corrected for the glycol solution.

While there are a lot of steps here, the Wizard makes it easy and walks you through the process.

