
Basics of Systems Tracing

— EPO 125 L —

What is a System Drawing?

Unlike the GPL, the rest of your drawings will involve tracing out one of five different systems on the Golden Bear. You will have to follow pipes and make a sketch of the flow path of the system.

You will NOT be graded on geographical accuracy in the engine room!

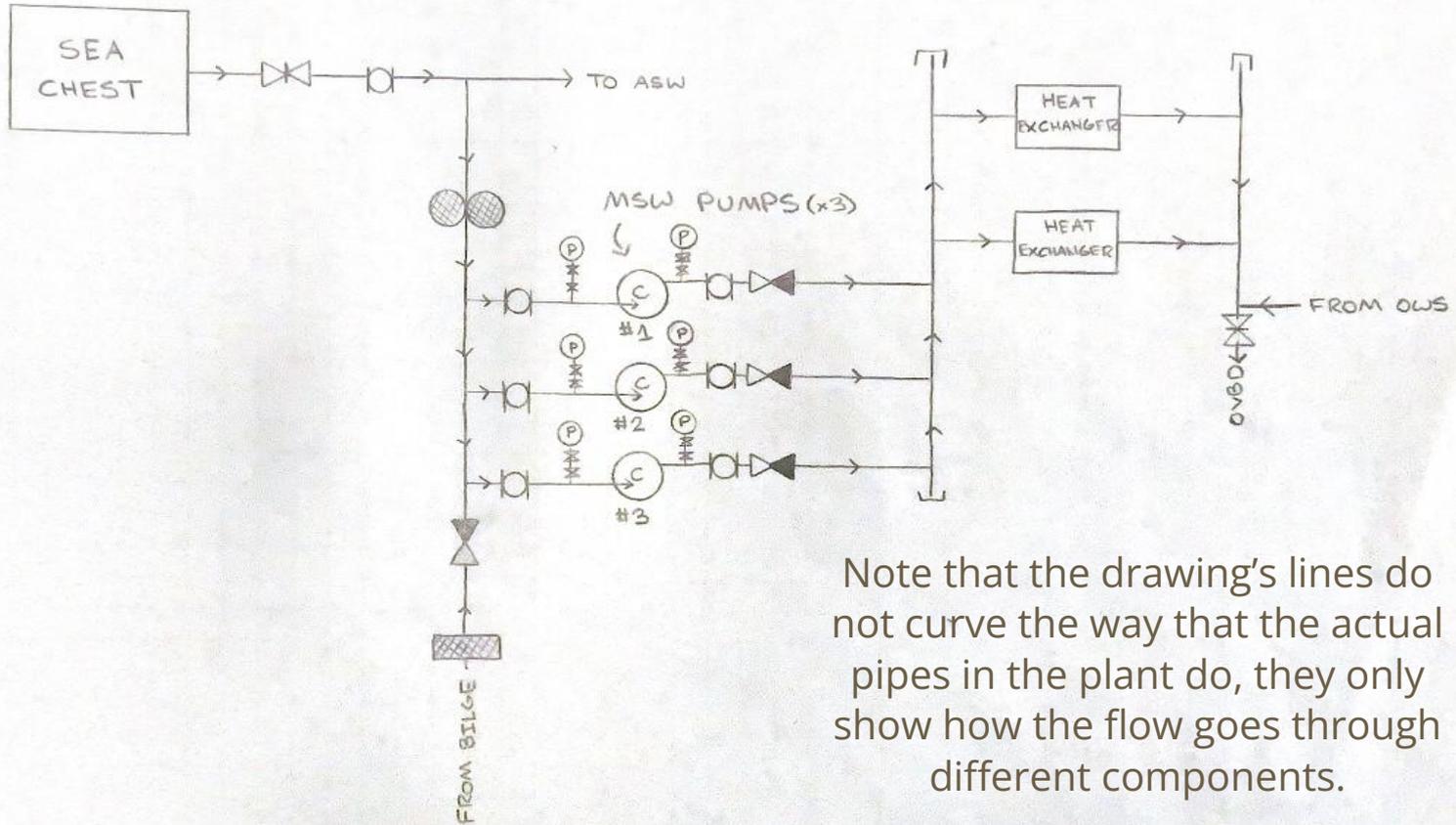
Rather, you will be graded based on your understanding of the functionality of the system and how the different components link together. Flow direction is key!

Main Salt Water (MSW) System Drawing Example

Here is an example drawing of the MSW system. (Next slide)

Note that everyone has different drawing styles, so your drawings do not have to look exactly like this. They serve for you to demonstrate your understanding of the systems.

When you are making a drawing, take breaks once in a while to make sure everything looks good and makes sense before you proceed further.



Note that the drawing's lines do not curve the way that the actual pipes in the plant do, they only show how the flow goes through different components.

How Do I Trace Out a System?

Whereas your GPL drawing was basically a map of the engine room, systems tracing involves finding **direction**, not location.

To begin a system drawing, start at a component where you know the direction that the fluid is traveling afterwards (ex. pump, tank, etc.) and follow the pipe where the fluid is traveling away from that component.

Follow the SAME pipe (don't jump around) through the system and draw the components it goes through (valves, strainers, heat exchangers, etc.) with the correct symbols.

What is Flow?

Flow refers to the direction of fluid movement through a pipe, be it water, air, oil, etc. Flow can be confusing, so don't be afraid to ask an ATO or try one of the methods below.

Tips for determining flow:

- Look for arrows on the sides of check valves (don't always trust these though, follow them and make sure that the flow direction they're showing makes sense).
- Start at the pumps or another place where flow is known.

Symbols

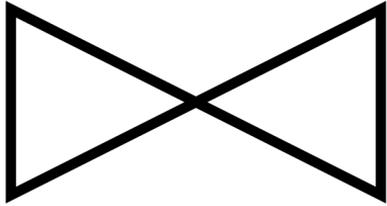
Using the correct symbols is a very important part of making a clear and accurate drawing.

You can refer to the symbol sheet you are given are in class (it's also on Brightspace!), but here's some common valves you will see as well as an example of what they look like in the plant.

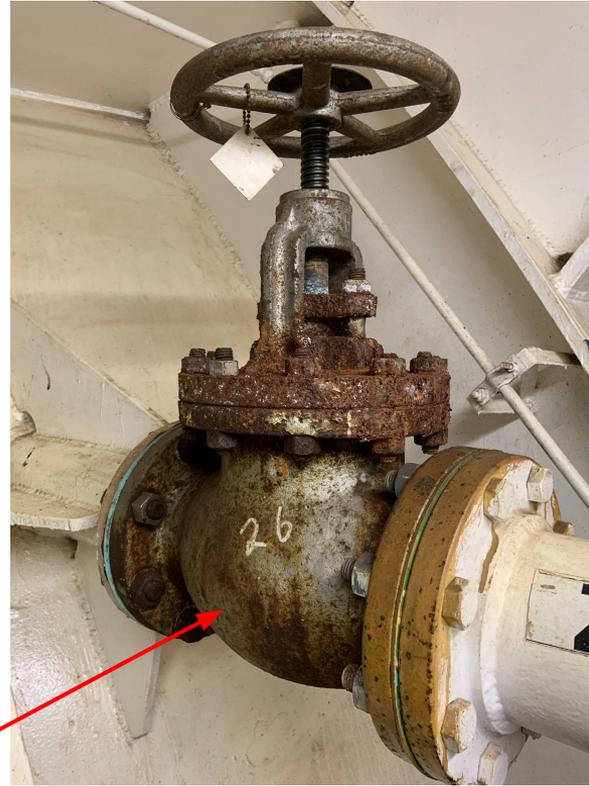
If you are ever confused or unsure about a symbol, just ask!

Disclaimer: It is possible for one component to have multiple symbols, so SOME of the ones shown in the following slides are NOT the only options.

Globe Valve

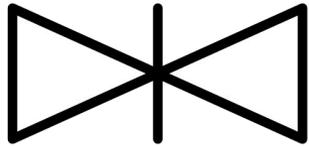


It is round. Like a globe.

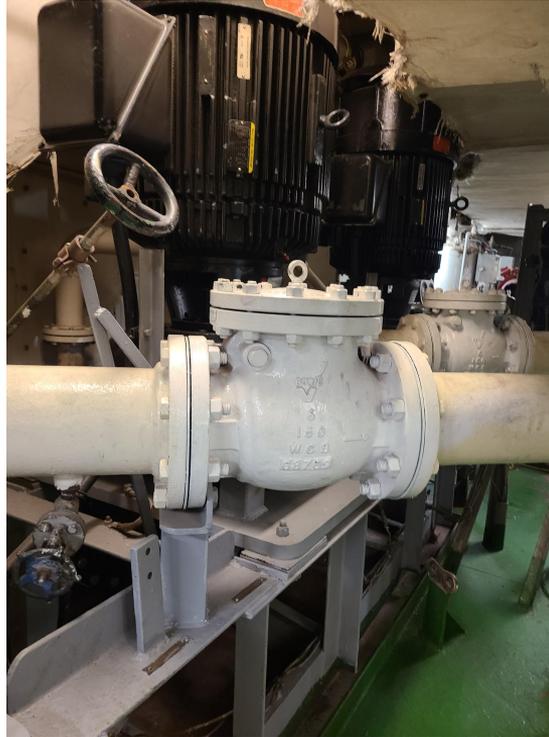
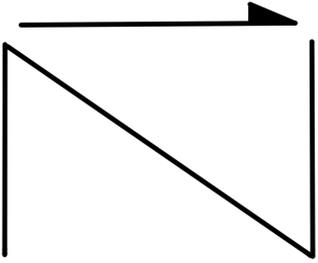


Gate Valve

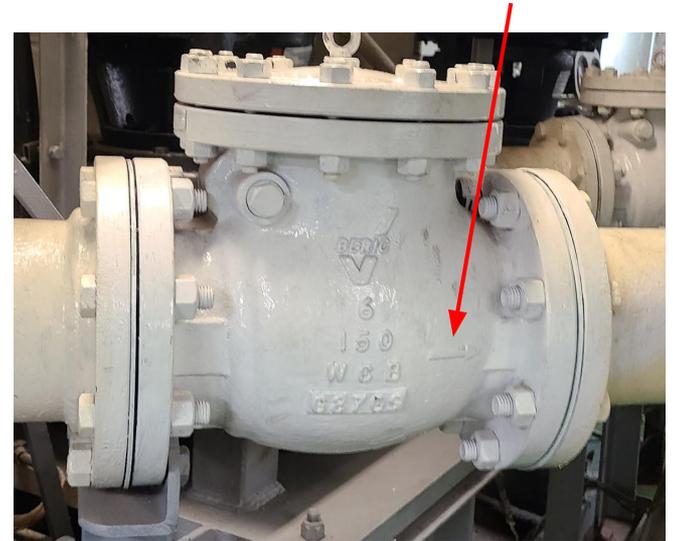
Globe and gate valves look very similar, so look on the valve handle to see if it's labeled.



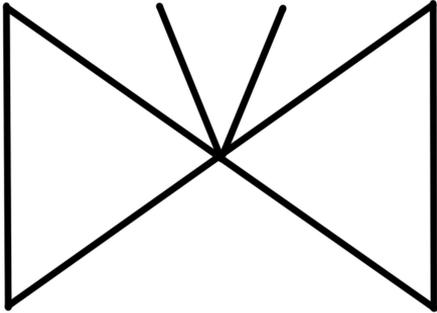
Swing-Check Valve



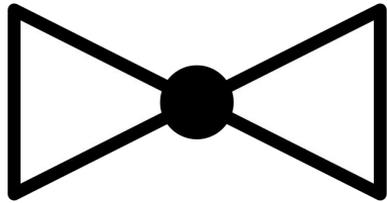
Note flow arrow on side of valve.



Butterfly Valve

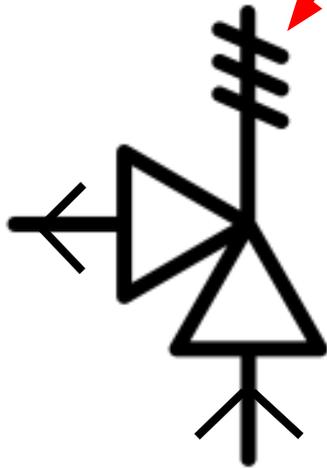


Ball Valve

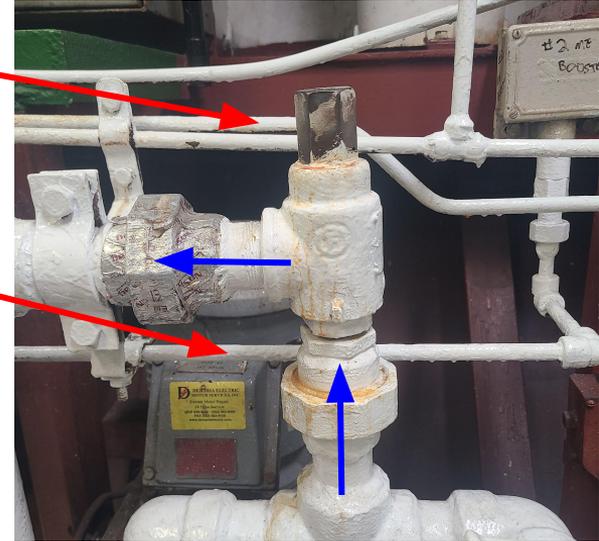


Pressure Relief Valve

These lines represent the spring on the valve!



The spring is in line with the flow!

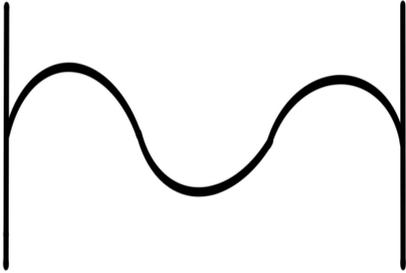


Pressure Relief Valve Cont.

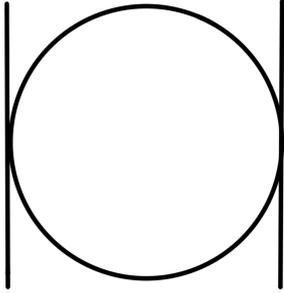
Here is a larger example.



Flexible Connections

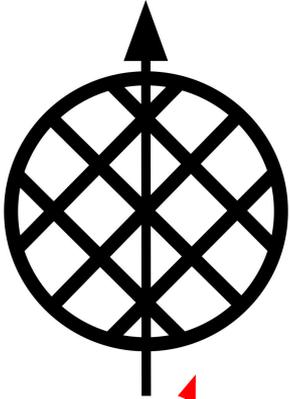


Expansion Joints



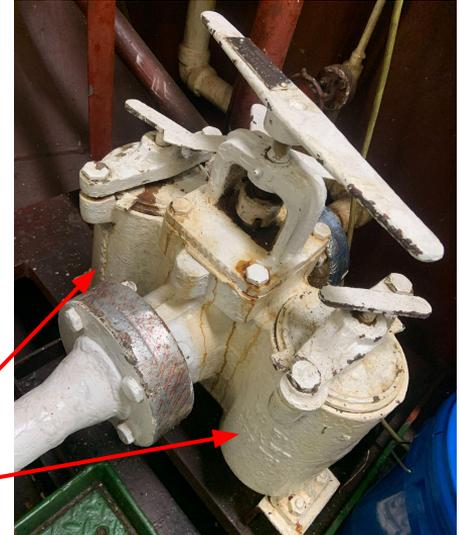
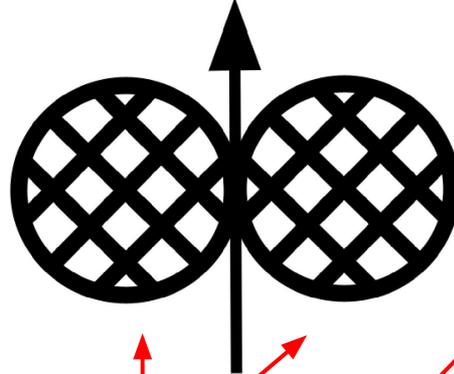
Strainers

Simplex



One basket!

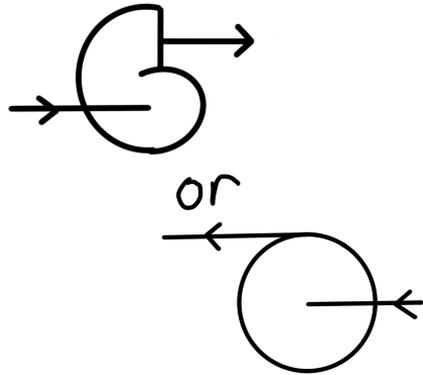
Duplex



Two baskets!

Pumps

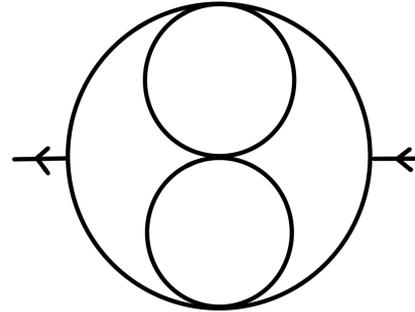
Centrifugal



Note the volute (the swirly/snail shell thing)



Positive Displacement



There are many different shapes and types of these that you will learn about!



You'll learn the difference between these two pump types during lecture

Steps for Success

1. When a new drawing is assigned, go to at least one training that same week!
 - a. Going to one or more trainings in the first week will allow you to get a solid start so you will be able to trace the rest on your own.
 - b. During the first week's trainings, the ATO's will often have a short session in lower class mess to run over the important aspects of the system.
2. Look at the rubric!
 - a. You will be given a grading rubric that shows what is required for each different system.
 - b. It will not only show what is required to earn points, but also what mistakes will cause you to lose points.
 - c. Go through each line on the rubric and make sure that your drawing fits into the requirements.

Your ATO's are here for you!

If you ever have any questions or are encountering issues with your systems drawings, please reach out to your ATO's for help.

They are here to support you and make sure you leave this class feeling confident in your ability to understand how to trace out systems. Check your emails regularly to make sure you read all emails from your ATO's.

Communication is key, if you're struggling, you won't get any help if you don't ask for it.

Good Luck!