

CHE 4253

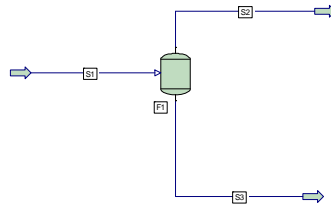
ASSIGNMENT 5

Due Sep 24

PROBLEM #1(Individual)

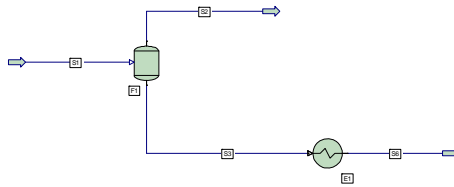
Consider a two phase 1000 lb-mole/hr stream with the following composition: Butane 33mol%, Pentane 51Mol%, hexane 16 Mol%, at 35 psia and 130°F.

- Calculate using Excel the composition of the vapor and the liquid if the stream is fed to a flash drum.
- Set up the problem in Pro II.

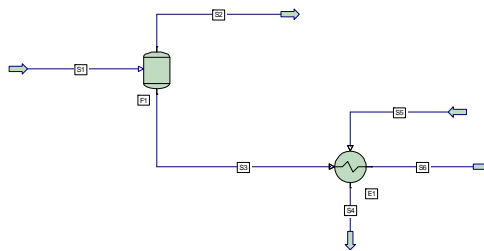


Choose the appropriate Thermodynamic system (use the Pro II Guidelines available in the Reference Manual. Justify your choice.

- You want to cool down your liquid to 85 °F, so you will add a simple exchanger. Set up the simulation specifying the outlet temp.



- Add a cooling water stream (available at 60 °F).

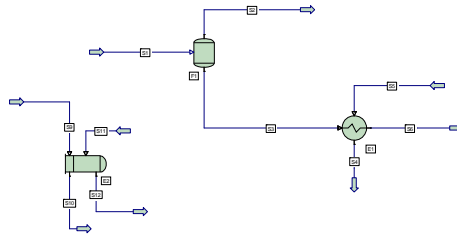


Calculate the amount of cooling water needed and use that amount. Find out a good value of U and propose an Area. Vary the area until the hydrocarbon liquid reaches the desired temperature.

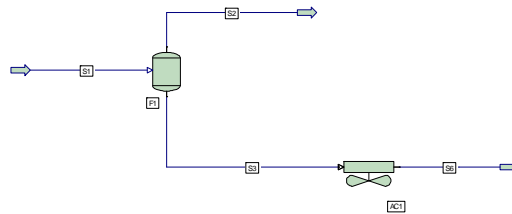
PROBLEM #2 (Group) *Graded as Project*

Consider the heat exchanger of problem 1.

- Go through ONE iteration of the design procedure for a shell and tube exchanger presented in class. Make sure your choices of 1-2, 1-1, exchanger etc. are considered.
- Use the rigorous exchanger of Pro II to obtain a better design. Use the Reference and DEFINE functions to create the flowsheet (see below). Information from a) should be useful. You have many different options to explore,... so please show them. Do not submit just one!!



- Assume that instead of cooling water, you want to use an air cooler. Design it. We did not lecture about it, so go to different sources and use pro II to troubleshoot the size (area, number of tubes, etc.). Your exchanger will work in Oklahoma year around.



- Design the flush drum as a vertical flash and as a horizontal flash drum. For the latter, determine your equations to obtain the dimensions.