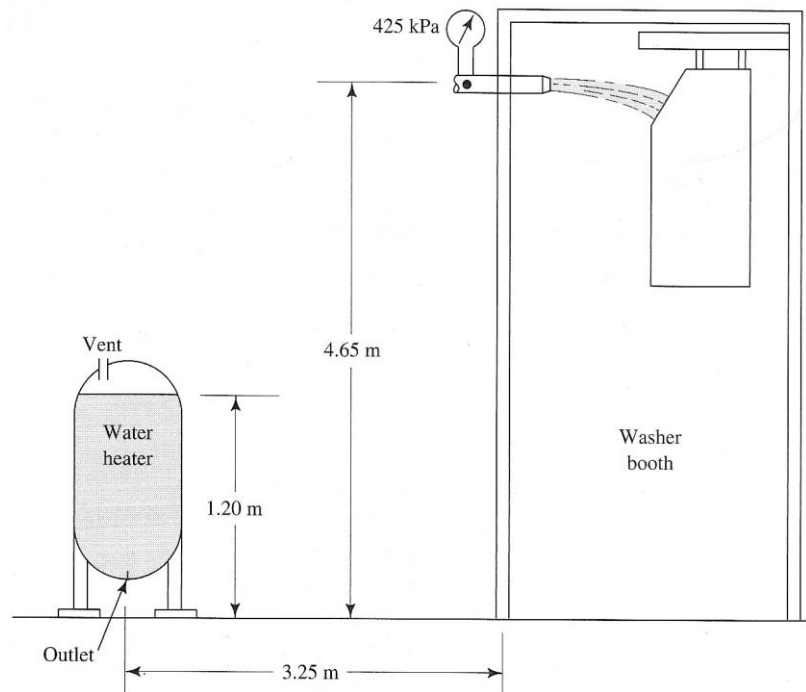


MENG 263 – Fluids & Heat Transfer

Assignment 3

Question 1

Design a system to pump water at 80°C from a water heater to a washing system as shown in the figure. The desired minimum flowrate is 750 L/min (198 USGPM).



Do the following (show ALL your work here)

- Layout the piping in the way that you think might be best.
Produce a nice sketch of the system.
Indicate where you would place valves and what types of valves they should be.
Indicate all other fittings.
- Determine both discharge and intake pipe sizes.
Select a pipe material and type.
Report the actual velocities of flow within the pipes (amongst much else).
- Show how you would support the pipe all the way from the tank to the washing station.
Include a few detailed sketches showing the pipe support structure and the types of pipe supports you would employ.
- Determine the head losses for the intake and the discharge parts of the system.
- Determine the total head loss.
- Determine the head added by the pump.
- Select a B&G pump from the online catalog (week 1 section of the course website)
For the pump you have selected state the following:
 - Model Number
 - Motor RPM

- Recommended Impeller Size
 - Recommended Motor Horse Power
 - Motor Horse Power you would actually specify
 - NPSHr
- h. Calculate the NPSHa and check the intake design against cavitation.
Will the pump cavitate?

Question 2

- a. Find the flowrate of water at 60°F in each pipe of the system shown.
- b. Summarize the final flowrates you worked out on a sketch of the system. Hand this in.
- c. Email your working spreadsheets ...
to: spaulding@camosun.bc.ca
subject: me263-a4-<YourNameHere>

Note: This entire problem has been detailed for you in the Hardy-Cross Workbook. It is the last example. Just try and create a completely functional and working spreadsheet that duplicates the results shown in the workbook example.

