Heat Transfer Questions & Answers

Question by Student 201542124

Professor, I have a question on assignment 8 for question 1. We don't know T_{b2} and only know T_{b1}. Should I assume average $T = 343K$ because the wall temperature is $344K$, pipe is long compared to radius and it is fully developed flow?

No, you have to follow the instructions associated with the correlation. If it's specified the properties need to be determined at the average bulk temperature, then you need to do so.

Question by Student 201312147

For example assignment#8 Q1, pipe is rough pipe. because pipes have eddis. So, I think this problem "Fully-developed turbulent flow (rough tubes)" should be applied to this problem. But in solving this problem, I found that Reynolds number is "0.5 < Pr < 2000, 3000 < Re < 5E6". This condition enables "Fully-developed turbulent flow (smooth and rough tubes)" to be applied to the problem. So I don't know which of the two should apply to this problem.

Whether there are eddies or not has nothing to do with surface roughness. You can have lots of eddies (turbulence) in a tube with perfectly smooth walls.

Question by Student 201312147

So assignment#8 Q1, pipe is having a relative roughness. Then, can I apply either of the equation in the table?

As long as all the conditions specified are met, you can use any correlation you wish.

Question by Student 201327111

Professor I have a question about this assignment 8 question 1. I was able to get right answer(63degree) using correlation for fully developed turbulent flow (smooth and rough tubes) with assumed average bulk temperature of 57degree. But after several iteration process, the bulk temperature of second state converged to 48degree. I wonder if the answer is right. If you don't mind, can you check the answer again?

Right, both answers for A8Q1 were not for this problem. I fixed them: check again.

Question by Student 201527143

Professor I have a question about A8Q5-b hint. I got friction factor value from the hint using momentum eqn. The value is same with F-D Laminar friction factor from the table. However, flow of (b) is turbulent. Which one should I use? F-D turb friction factor from the table or Hint?

The friction factor mentioned in the "hint" is valid for both laminar or turbulent flows.

Question by Student 201527130

I have a question about assumptions.

$$m(Cp_2 Tb_2 - Cp_1 Tb_1) = q_{ADDED}$$

For using this equation(m is massflow) and defining bulk temperature, I need to assume that density is constant. But in gass case, density is not constant. So the question is how to use bulk temperature in gass case?

For a gas, you don't need to assume constant density but you need to assume negligible kinetic energy change. I think I mentioned this in class..