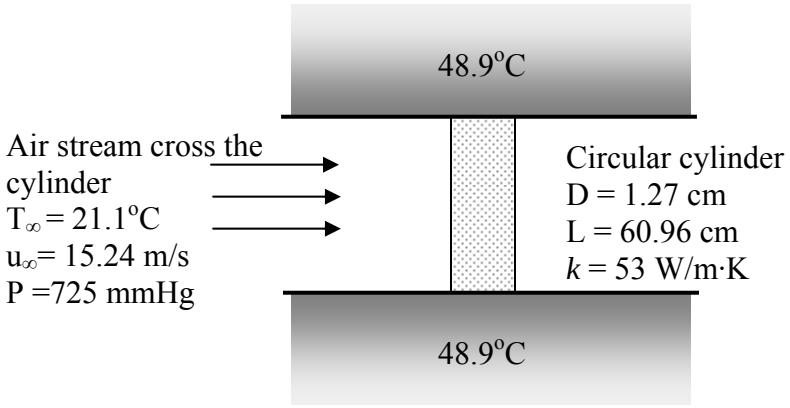
MAE 3314: Heat Transfer
Homework #7 (Due date – 11/13/07)

1. [10 pts] Calculate the rate of heat transfer per unit length for 10-mm-diameter cylinder maintained at 50°C with the flowing fluids in cross flow over the cylinder at T_∞=20°C and u_∞=5m/s.
   (a) atmospheric air
   (b) water
   (c) engine oil

2. [10 pts] Given the cylinder in cross flow, find:

   (a) $\bar{h}$ for the cylinder.
   (b) total heat transfer from the cylinder to the air stream.



3. [10 pts] Air at 1 atm and 10°C flows over a tube bank (15 rows high and 10 rows deep) at an upstream velocity of 7 m/s. Tube surfaces are maintained at 65°C. Tubes are 2.54 cm in diameter and has aligned configuration. S_T=3.175 cm, S_L=3.81 cm. Calculate total heat transfer per unit length and the exit air temperature.

Hyejin Moon (Hyejin.moon@uta.edu)