Experiment 2 - Pipe Flow

Questions

1. Calculate velocity and Reynolds number for each run.
2. Does your data verify the proportionality between the pressure drop in the pipe and the pipe diameter for pipes 2 and 3? Display the correlation.
3. Estimate and plot the friction factors as a function of the Reynolds numbers for all straight pipes; use a separate plot for each pipe. The plots should be on a log-log scale similar to the Moody plot.
4. Graphically compare the trends in the above plots (question 3) with the Moody plot to estimate the relative roughness of each pipe. Comment on this comparison, including reasons for any discrepancies.
5. Compare the relative roughness between the two different pipe materials. Comment on why there could be any discrepancies in the roughness found from the Moody diagram and the actual roughness of the pipe.
6. Calculate the loss coefficient, K, for each elbow in the pipe with elbows, as a function of the average Reynolds number. Discuss the results. Does K follow the trends you expect?
7. Using the frictions factor estimated in question 3, determine the equivalent length of a straight pipe required to produce the same head losses as the pipe with elbows.
8. Compare this length from question 7 with the actual length of the pipe with elbows (if it were 'straightened' out). Comment on this comparison including reasons for any discrepancies.