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**TO:** Team D  
**FROM:** Engineering management  
**SUBJECT:** Evaluation of Friction Losses in Pipes

As you know, our lab includes an apparatus for measurement of friction losses in pipes. A competing lab has measured the Fanning friction factor,  $f$ , in four types of pipe, and claims that true replicates at a given condition exhibit a standard deviation that is less than 10% of  $f$ .

We have installed the same pipes in our lab. How does our variability compare to theirs? Can we say that ours is also less than 10%? Please check for each pipe over a range of flow conditions at which you'd expect the Blasius equation to be accurate.

In addition to assessing the variability in your results, determine the mean  $f$  at each condition and compare these values to the Blasius equation. If they differ significantly, can you explain?