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**TO:** Team B  
**FROM:** Engineering Management  
**SUBJECT:** Gas Flow Measurement

Our ethylene oxide plant has asked us to evaluate methods for measuring gas flow rates. These measurements are essential for control of reactor recycle streams. The process engineer is particularly interested in a comparison of a Venturi meter, orifice meter, Pitot meter, and a thermal mass flow meter. Our machinist has already installed examples of these in a conduit located in our lab. The thermal mass flow meter uses the approach described in Example 10.11 of "Engineering Experimentation" (Wheeler & Ganji).

We have already tested the Orifice meter, finding that it meets the expected accuracy standards for such meters (e.g., see Perry's). Use it as a basis for calibration of the others. For the Pitot meter, use the maximum velocity location only (i.e., do not traverse the pipe diameter). Report the conduit Reynolds number at each condition studied.

We are particularly interested in the approach required to calibrate each meter. What calibration model do you suggest? What are its adjustable parameters? How well does it fit the data you obtain?