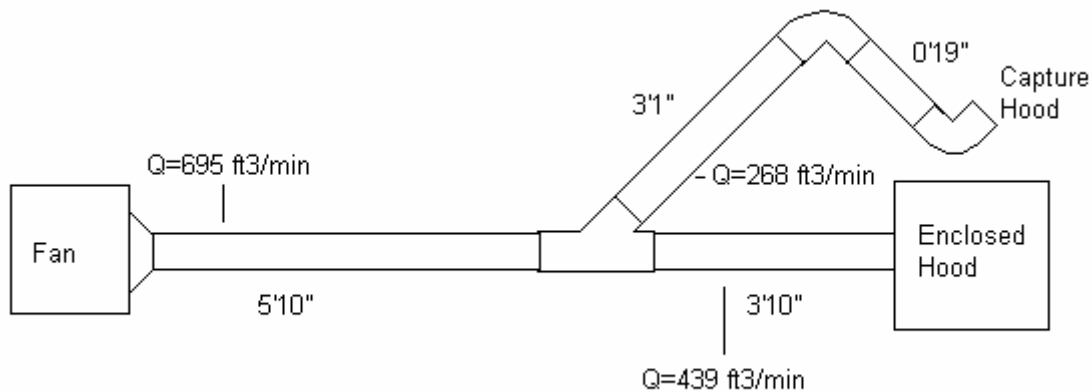


The system:



### 1. Instrument Review

- Pitot tube
- Pressure measurement (U-tube, magnehelic gauge, digital micromanometer)
- Hot wire anemometer
- Tachometer

### 2. Calculations Review

$$Q = V \cdot A$$

$$TP = SP + VP$$

### 3. Lab Exercises

#### A. Enclosing hood

- Measure the face velocity for the hood.
- What is the  $Q$  for the hood? \_\_\_\_\_
- What is the hood static pressure? \_\_\_\_\_
- What is the coefficient of entry for the hood?
- Is this a compound hood?
- What happens when you remove the grill in the hood?
- How is data interpreted? What would results be compared to?

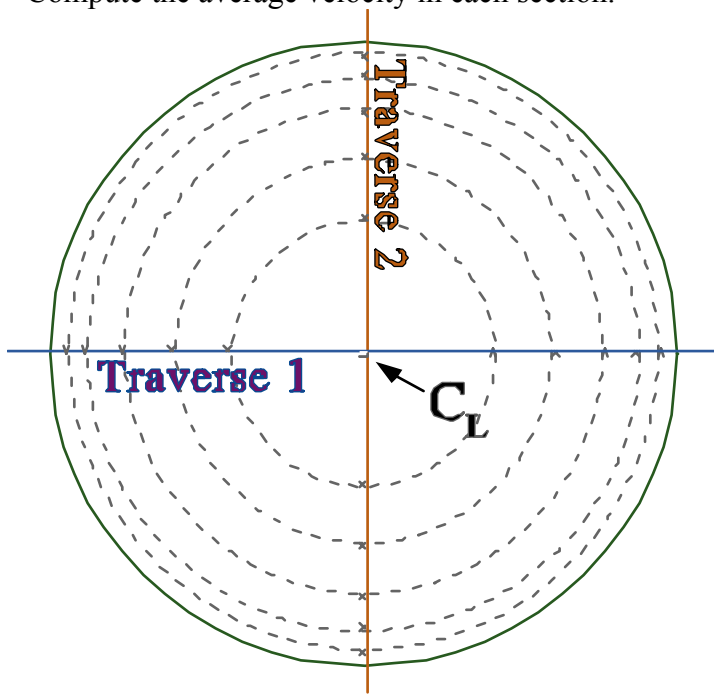
#### B. Capture hood

- Determine the capture velocity for a plain open duct hood at distances of  $x=d/2$  and  $x=d$
- Measure the face velocity for the hood.
- What is the  $Q$  for the hood? \_\_\_\_\_
- Measure the hood static pressure? \_\_\_\_\_
- What is the coefficient of entry for the hood?
- Can you measure the vena contracta region?
- How does the  $C_e$  you determined compare to a value from a text book?
- What simple baffle modification would allow for greater capture velocity?  
Try your idea and measure the result.

#### C. System modeling & measurement

- Measure the velocity static and total pressure, in each branch by a pitot traverse.
- Measure the velocity static and total pressure in the main duct after the junction by a pitot traverse.

- Compute the average velocity in each section.



## Unequal increments, equal areas

- Does the total Q add up? Does the TP add up?
- What happens if you partially close off the blast gate?
- How is the air flow redistributed in the branches as you close the blast gate?
- Measure the static and total pressure at 3 points in the main duct.
- Estimate the loss coefficient for this pipe? Is your measurement reliable?
- Make a table to summarize the VP, SP and TP at different points in the system. Graph the system.
  
- Homework assignment: take your measurements and make a model for this system in the spreadsheet provided on the web site. Compare your measurements with the predictions.

Extra:

Experiment with different velocity measuring devices, the Alnor and the hot wire meter.