I was curious about how big our carbuertor/fuel injection intake diameter should really be. That is, what size diameter would pass enough air based on our speed to input the amount of air needed for the cubic inches of our engines at a specific RPM. So I did some calculations.

d = The diameter of our air scoop
S = The speed of the plane in knots
R = rpm of the engine
C = Cubic inch size of the engine

The amount of cubic inches that we need per minute are just 1/2 of the size because of the fact that the engine is a 4 stroke and every piston only needs its air on every other stroke. We can represent this in the following formula:

$$V\frac{in^3}{\min} = \frac{1}{2} \times \frac{R}{\min} \times C \cdot in^3$$

The foumula for the intake air volume in terms of the intake diameter is also just about as simple:

$$V\frac{in^3}{\min} = \pi \times \left(\frac{1}{2} d \cdot in\right)^2 \times S \cdot \frac{nm}{hr} \times 72{,}913 \cdot \frac{in}{nm} \times \frac{1}{60} \cdot \frac{hr}{\min}$$