

The subject for this month's Q&A is sizing fuel lines for small aircraft. This is something that is hard to give a good answer to that will apply to every project. Most of the time this should already be figured out for you by the designer of the aircraft. What I have seen in the field is that generally, if the engine is rated at, say 50 hp it would have 1/4" fuel lines. If it was 65-180 hp it would usually have 3/8" fuel lines. And so on. Again, these are general numbers and what you really need to know is that there is going to be enough volume of fuel delivered to the carburetor at the right pressure. The following are some FAR 23 guidelines for certificated aircraft that may be helpful for the homebuilder as a guideline.

The size of the fuel lines in a typical single engine light aircraft are determined by the fuel consumption rate of the engine. The lines in a gravity feed system need to be large enough to supply at least 150% of the fuel consumption of the engine at full power. In a pressurized fuel system (pumped) they need to be able to supply at least 125% of the fuel consumption at full power. (AC 90-89A pg 23)(FAR 23.955) The formula for fuel flow rate in a gravity feed system is $.55 \times \text{engine horse power} \times 1.50 =$ pounds of fuel per hour divided by 60 to get pounds per minute divided by 6 to get gallons per minute. In a pressurized system simply substitute 1.25 for 1.50.

The line size will vary per installation depending on a number of factors including how high the fuel tank is above the carburetor inlet and what kind of restrictions are in the line (filters, screens, valves). Generally, if the flow is not high enough the line size needs to be larger, but if the pressure is not high enough either the height of the fuel tank above the carburetor needs to increase, or a fuel pump needs to be added to the system.

AC 90-89A is available here:

[http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/d08fa9393154b636862569ba006f6d7f/\\$FILE/ATTLMVEO/AC90-89A.pdf](http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/d08fa9393154b636862569ba006f6d7f/$FILE/ATTLMVEO/AC90-89A.pdf)

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