Fuel system pointers

Things to consider in a fuel system

- Never use paper element fuel filters, water will plug/restrict flow.
- Should use a gascolator (separates water and pre-filter).
- Fuel pumps should be upstream of gascolator (debris will cause the pump to fail).
- Fuel pumps do not suck, they pump liquids only.
- If engine requires a fuel pump to operate, an auxiliary pump and a fuel pressure gage should be installed.
- If a mechanical fuel pressure gage is used always isolate the fuel from going into the cabin, (to instruments panel). Even hot rods use this approach.
- Always use a firewall fitting to cross the firewall with a fuel line.
- Keep heat away from fuel lines, pumps, filters and gascolator.
- Fire sleeves buy time in the event of a fire.
- When fuel injection is used, the fuel return line from the fuel rail should have a one way valve as close as possible to the returned tank; this may prevent fuel leaks in a forced landing condition.
- Fuel valve to shut off supply in the event of an engine fire. In high pressure fuel circuits it should de-pressurize the fuel lines/rail for safe forced landings, it also helps when servicing. As an example, try to replace the fuel filter in your modern vehicle after you shut it off, you will be surprised how much fuel it will spray and for some time.
- Always perform a fuel flow test, use aircraft practices, 150% flow for gravity and 125% for pumps. .55lb x hp/6 = U.S gallon the safety factor. Remember to look at the rating of the pump. If you purchased a 30 gal/hr pump it should give you close to that. Do not accept a much lower reading.
- On automotive fuel injection application take the reading from the return line going back to low pressure, it will ensure that the pump not only is able to overcome the fuel regulator setting but also give you a surplus. If the pump does not overcome the fuel regulator you will end up with a vapor lock, injectors are not good vapor sprayers, if your fuel rail percolates the fuel, your engine will quit. One reason to have to have a fuel pressure gage and a back-up pump.

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- One last test before attempting flight.

- Tie down the airplane in a climb attitude, climb on board, warm-up the engine and then give it full throttle for 10 minutes at maximum rpm assuming that the proper propeller is bolted on. If your installation passes the test without overheating or miss-firing leaking or vibrating/shaking, it may be ready for one circuit but will you?

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