

## **Make Your Own Smoke System**

### **THE HARDWARE REQUIRED**

There is no rocket science required here—just pump oil into a red hot exhaust pipe and it will smoke. That means you need:

1. A tank to hold the smoke oil.
2. An electric pump to pump the oil.
3. A switch to turn the pump on and off.
4. A means of getting the oil inside the exhaust pipe.
5. Hoses to connect the tank to the pump.
6. Hoses going from the pump, through the firewall, to the exhaust pipes.
7. Get the FAA to approve all this on a 337 form for a certified airplane, experimentals do not need any approval.

**Item 1:** Tank should be a minimum of 5 gallons for skywriting. If it's just for playing around a gallon or two will be fine. If weight is no concern I have found that an old discarded Freon tank works fine; they come in different sizes. You can also always have a custom aluminum tank made.

**Item 2:** The pump needs to put out around 20/30 psi which means that most fuel pumps do not work or they cost a fortune. I have had good results with a Shurflo pump model 100-009-21. They are really a 12-volt water pump available from RV dealers—cheap and effective.

**Item 3:** A simple on/off aircraft quality switch, nothing fancy here. Be sure and use a fuse or circuit breaker.

**Item 4:** Here is the secret to getting *lots* of smoke and also making things simple. I have invented what I call a smoke oil injector nozzle that really works. Just throw oil inside the exhaust any way you can and you will get smoke, but if you can spray that oil into the pipe in a 180 degree wide, razor thin arc you will get a lot more smoke simply because it burns better than just dumping it in. The spray pattern I am talking about is like you get when you go to one of those self serve, spray it off, car washes: A wide, thin, high pressure spray pattern.

My injectors actually give a much wider spray pattern. They attach to the exhaust pipe just like an exhaust gas temperature probe, that is to say, with a hose clamp. Just drill a quarter-inch hole in the exhaust pipe in any convenient spot before the pipe reaches the muffler and insert the injector and tighten the hose clamp. Actually you need two of the injectors. Presto, and no welding inside your engine compartment. If you ever want to remove them permanently, any decent welder can close up a quarter inch hole.

**Item 5:** Usually aircraft fuel hose works well on the cool side of the firewall. Remember, we only have about 20 psi pressure so low pressure hose is ok. On the engine or hot side of the firewall you should use high temp hoses and/or fire sleeves.

**Item 6:** Already covered in item 5.

**Item 7:** Make a drawing and materials list before you put it on a certified airplane and let your local airframe and powerplant mechanic (A&P) and the FAA work it out.

Experimentals, use the same common sense as when you built your airplane.

I have built and sold literally hundreds of smoke systems but the only thing I can currently supply is the smoke oil injectors. They are made out of stainless steel, one by one, on a lathe. I will be glad to talk to anyone if they need any more information.

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