

Why You're More Likely To Have An Engine Fire This Fall

- By [Colin Cutler](#)

Fall flying means cold engine starts, especially early in the morning. And cold starts often lead to engine fires.

Gas, like any other liquid, doesn't evaporate as much when it's cold. And when it's really cold, gas evaporates *very* slowly, making it hard to burn.

On top of that, your engine's oil is thicker when it's cold, making it harder to move when the engine is turning during a start. That means your engine doesn't turn as fast while you're cranking it.

To top it all off, your battery can't produce as many electrons when it's cold, meaning your starter doesn't have as much energy to work with, causing it to crank slowly.

All of this leads to the first problem with cold engine starts: **over priming**.

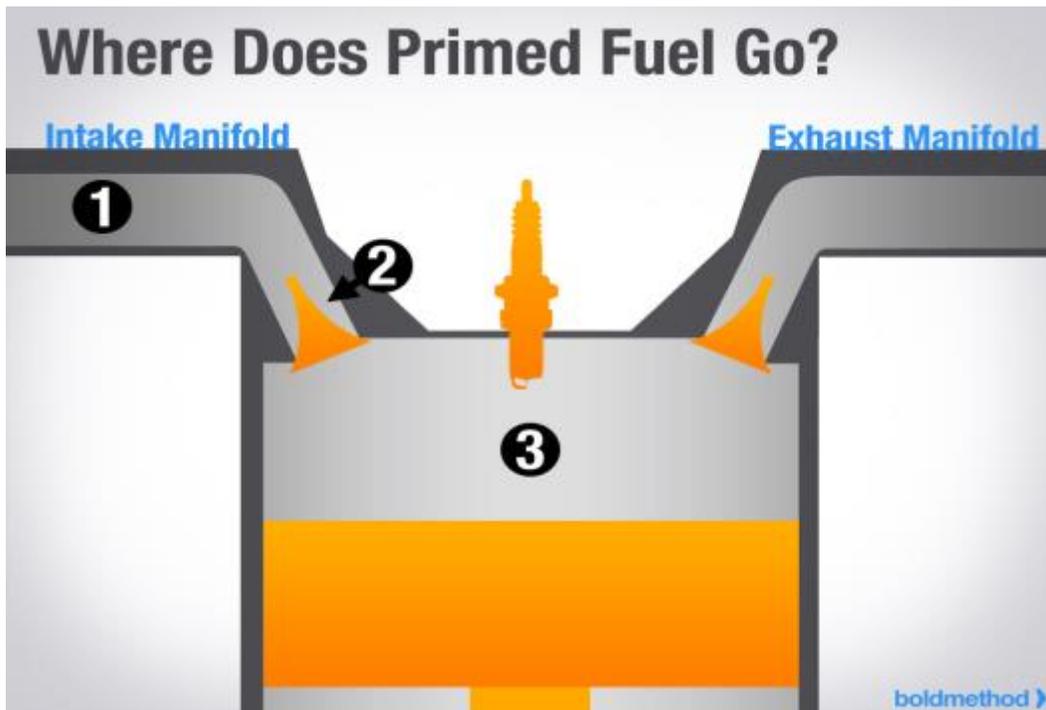
Priming: How Much Is Too Much?

Whether you're flying a carbureted or fuel injected engine, you're going to prime it for a cold start. And when it's really cold, it's easy to feel like you need to give your engine a little extra 'shot' of gas to get it going.

But that's where the problem starts, because **over-priming is the leading cause of engine fires on the ground**.

When you prime an engine, you're putting fuel into the intake manifold so the cylinders are ready to fire. And if you over-prime, you're putting too much fuel into one of three places:

- 1) The intake manifold, right in front of the intake valve
- 2) The valve-chamber, where the fuel will be sucked into the cylinder
- 3) Directly into the cylinder itself

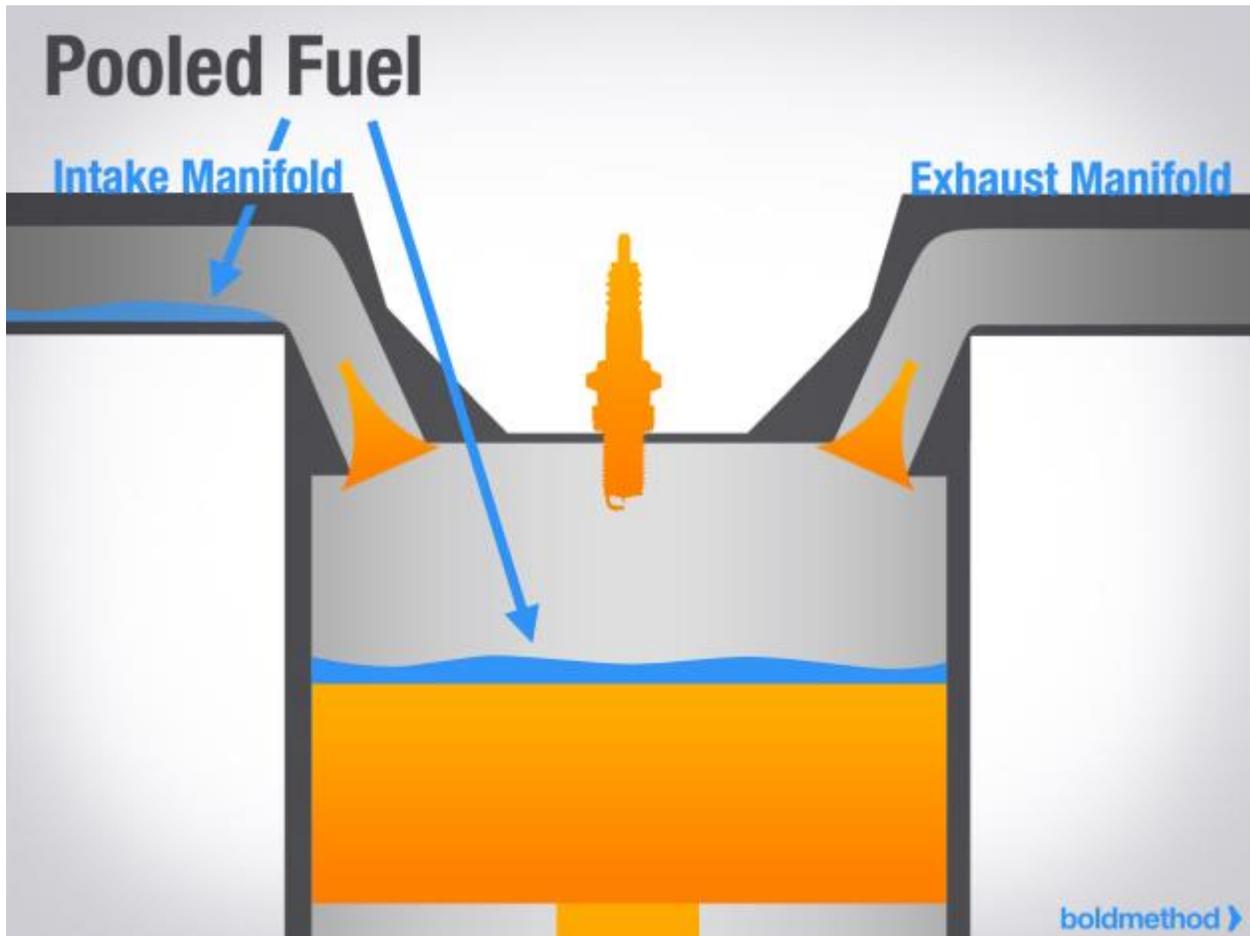


For your engine to start, you need the right fuel-to-air ratio, which is roughly 15 parts air to one part fuel. If you prime your engine too much, your fuel-to-air ratio is off, and the mixture won't ignite.

On top of that, excess fuel can pool in the manifold or cylinder, leading to problem #2.

Pooled Fuel: A Fire Waiting To Happen

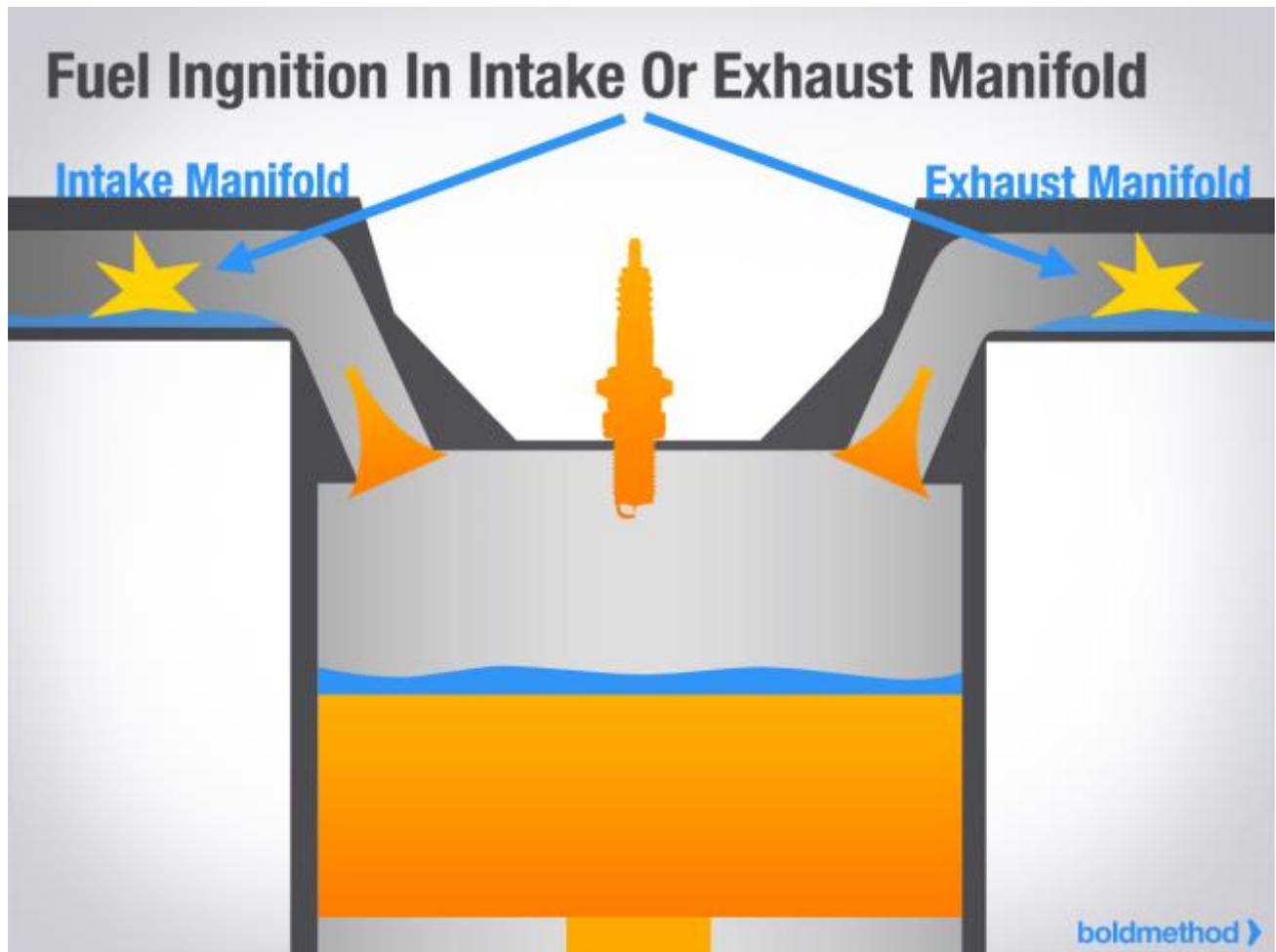
If you add too much fuel during priming, it can leave its gaseous state and become liquefied.



When fuel becomes liquid in your cylinder, it starts splashing around, waiting for a spark to ignite it. As it continues splashing, it creates a smaller fuel-to-air ratio, and eventually it ignites (usually with a big BOOM).

The splashing fuel travels one of two places as it ignites:

- **1) The exhaust manifold:** the ignited fuel exits through the fire-proof exhaust system, and it's not a big deal (most of the time).
- **2) The intake manifold:** the splashed fuel can also exit through the intake manifold. If you're unlucky, this ignited fuel might run down into the carburetor or fuel-injector assembly. These parts are not fire-proof, and the fuel can literally burn through them. If this happens, you're in trouble.



What You Can Do About It

So how do you know if you're over-primed? And if you are, what can you do about it?

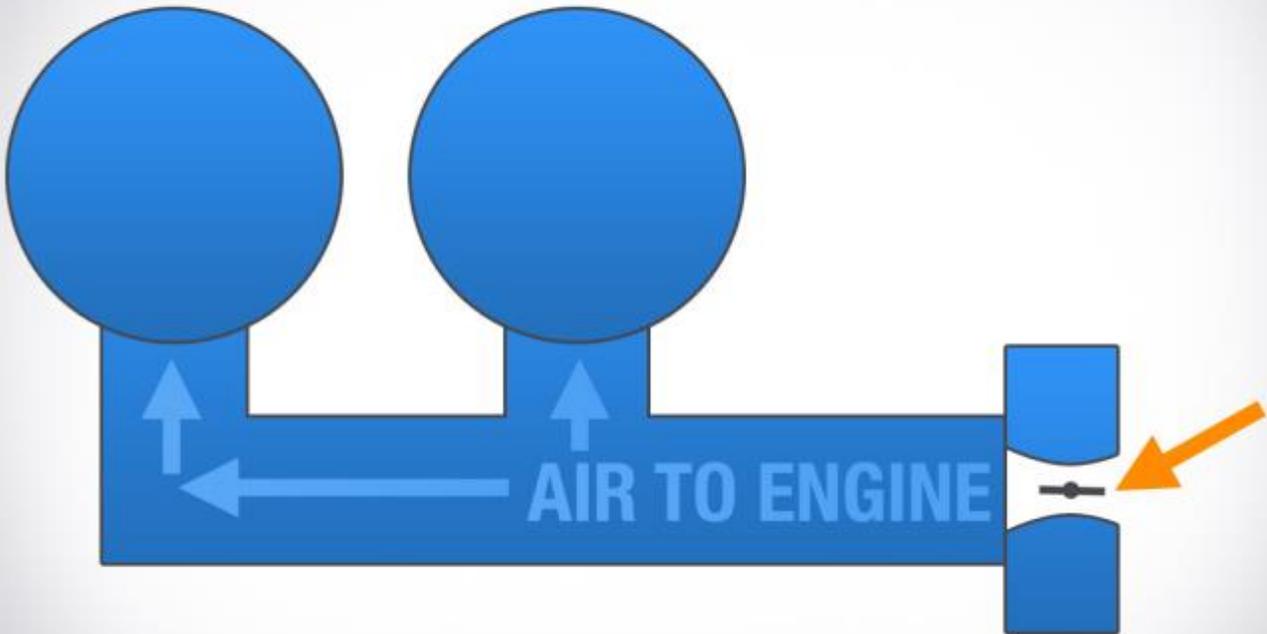
If your plane is over-primed, you can usually smell fuel. And if you've *really* over primed, you can probably see fuel dripping from the exhaust pipe or other parts of the cowling.

First off, if you've slightly over-primed, you can typically use a specialized start procedure for your plane. But if you're over-primed to the point where fuel is dripping from the cowling or exhaust pipe, you need to **not** start the engine.

Instead, you need to give the engine time to evaporate the extra fuel. To do that, open the throttle to full, which opens the engine's butterfly valve.

By sending air through the engine, you give the pooled gas time to vaporize. How long does it take? It really depends on the engine, and how over-primed it is, but giving the engine 10-15 minutes to air out usually does the trick.

Full Throttle = Butterfly Open



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So when you're flying this fall, remember that even though you *feel* like you need a little extra prime, sticking to your normal priming procedure is the best bet.

Over-priming is the leading cause of engine fires on the ground. Avoid putting too much gas into your engine during start, and you'll significantly reduce the chance of starting your plane on fire. After all, we'd much rather see your plane without the charred fire marks on it.