

## Lean for Taxi

Your airplane engine at full rich burns more fuel on the ground than it needs. This is primarily because you *want* extra fuel on takeoff and climb, so full rich errs to the excessive. (See “Increasing Cooling During Climb: Airflow, Fuel Flow, and Power Setting” on page 41.) This is simply a waste at idle, and can even cause problems due to carbon and lead building up on the spark plugs.

Many POHs recommend an idle speed of about 1100 RPM to avoid spark plug fouling. However, a super-lean fuel mixture is arguably better for achieving this. It also allows you to idle at a lower RPM, which saves fuel over the long haul. (If you have a floatplane, this is even more important as you probably need an extra low idle speed for water taxi.)

The fix is simple: Lean the mixture as aggressively as you can after the engine starts. The general process is to lean until engine RPM rises—and then continue until engine RPM falls, but not so much that the engine stumbles (or quits).

If the engine is cold (page 12), this may not be that far. In fact, as the engine is warming up, you might only lean to maximum RPM or peak EGT to

*A cold engine needs extra fuel at idle during the first few minutes of operation, but you can aggressively lean for taxi while the oil is still cold. The time from when you start the engine until you're ready for taxi is probably enough. Eventually, you'll learn the mixture position that lets you taxi, but will simply quit if you attempt a takeoff without enrichening.*



### TIP

For Rotax engines, mixture is completely automatic and you don't lean for taxi. They run richer than needed at idle, but their electronic ignitions at least help keep their spark plugs clean.

help generate extra heat and get things warmed up sooner. Your passenger wishing for more cabin heat will thank you. To be clear, this is done at idle speed, even if that's slightly faster than minimum idle speed as the engine warms up.

Within a few minutes of starting, however, you should be able to lean so much that opening the throttle more than the amount required for taxi speeds will cause the engine to stumble. That's important for safety because it prevents you from attempting a takeoff with the mixture still in this lean condition.

When it comes time for a runup, you'll need to set a rich mixture again. Make sure your checklist includes mixture rich in the runup because some engines will still run at the recommended runup RPM even if aggressively leaned.

After runup, aggressively lean again. So long as you lean so much you can't possibly take off, there's no danger. However, there have been many pilots who unwittingly took off with a fouled plug that tested fine at runup because they idled on the ground full rich after runup fiddling with their GPS or waiting for a clearance to depart from Tower.