

## My new engine runs HOT!!!!????

Other than the traditional “heavy wing” crisis, the most common first flight question is “My engine runs hot, what do I do?” After extracting as much pertinent info as the builder will share, usually the answer is “Nothing – keep flying.” Here’s why.

Read Lycoming Service Instruction No. 1427B.

It’s usual during the first few hours of flight with a new or overhauled engine for it to run hotter than it will later when it is broken in. You need to run above 65-70% power for at least the first 2-3 hours (Lycoming say 50hrs, but the first few are the most important) to seat the rings properly, and until that’s done there is significant internal friction. Add-ons like electronic ignition, CS props, plenums, high-compression pistons etc will exacerbate any heat problem.

Don’t worry about oil temps at or below 230F and/or CHT up to 440F or so. It is OK to run the engine at those temps for break in; they are still below redline (245F for oil, 500 for CHT). Don’t throttle back below 70% power unless the temps reach those limits, or possibly you’ll glaze the cylinders.

Tips for initial flight tests to minimize heat problems:

1. Calibrate your oil temperature and CHT gauges with boiling water (212F) before you fly to make sure they’re accurate.
2. It’s handy to have a Manifold Pressure gauge even on an airplane with a fixed pitch prop. If you’re relying on rpm only, you’re guessing at the power setting anytime the throttle is retarded from full. Power settings as a combination of MP and RPM can be found in the Lycoming Operator’s Manual, or can be estimated by adding the RPM (in 100s) to MP (in inches). 2400rpm + 24” MP = 48, which is roughly 75% power. 45 = 65% power, so for break in purposes you never want the RPM + MP to fall below about 46/47 (eg 2300rpm + 23” MP).
3. Check the plugs for correct heat rating, and the ignition timing.
4. Aim to do initial flights on cool days. If you must do it in Arizona in August, at least fly as early in the morning as possible. Ambient temps over 70 degrees won’t help. Early morning usually means smooth air too, another benefit. We get a lot fewer calls about hot engines in the winter.
5. Check the baffling. You did remember to install the inlet ramps on the upper cowl? And close all those awkward gaps around the baffles behind the spinner? And caulked all the gaps between the baffles and the engine case? Air that bypasses the cylinder fins is of no value.
6. Keep climbs shallow and airspeed high to maximize cooling. Do NOT climb out at 80smph. Make it more like 110-120smph minimum.
7. If the CHTs are low/normal, but the oil temp is high, check the Vernatherm valve to make sure that is diverting oil to the cooler properly. In addition, higher oil temps are common on angle valve and custom Lycomings that have piston oil jets installed as more heat is extracted through the oil in those engines.
8. If you have a CS prop, dial the rpm back to 2400 or so ASAP after takeoff, or even leave the blue knob back before t/o. Less rpm = less heat. Plus, the internal cylinder pressure will be higher, assisting ring seating.
9. Make sure the mixture lever on the carburetor or fuel servo really is at the full rich stop. Most carburetors will run richer at full throttle, so paradoxically the engine may run cooler at full, rather than partial, throttle. Lean only when necessary for high altitude operations, otherwise keep the mixture as rich as possible while maintaining smooth engine operation.