

# AeroShell TECH TALK

## FREQUENTLY ASKED QUESTIONS.

**If my aircraft engine has a Supplemental Type Certificate for automotive gasoline, can I break in a new engine with it?**

No. Most of the metallurgy in the valve train of aircraft engines was designed to be operated on leaded fuels. Even 80/87 engines were designed for fuels with 0.5 gram per gallon lead. Experience has shown that the lead level in aviation gasoline is especially critical during break-in. So, if you're breaking in a new or an overhauled engine, make sure you use a leaded or 100/130 low lead aviation gasoline for at least the first 50 hours of operation.

**How can I safely dissipate a static charge generated when refueling?**

Whenever fuel is poured, pumped or moved from one container to another, a static charge is generated. The same principle is in effect when you walk across a carpet in the winter and get a shock from a doorknob. The charge level and the distance that can be jumped or arced depends on several factors—pump rate, temperature, humidity and containers. Static electricity is the reason why a ground wire is always connected to commercial airliners and transport trucks whenever fuel is being transferred. When you transfer fuel into your car or light aircraft, the hose has a built-in ground wire that acts as an electrical path to dissipate any static charge. As an added precaution, there is usually an excessively-rich air/fuel ratio in the fill pipe which will not burn. There are two primary areas where a pilot should exercise caution when transferring fuel.

The first is draining an aircraft tank. For example, if you're draining a wing tank, you should always connect a jumper cable from the plane to the fuel

container. This will dissipate the charge and eliminate the chance of a spark jumping from plane to container, causing a fire. Remember, when you're draining fuel, there can be enough air circulation so that the air/fuel ratio is in the combustible range.

The second area of concern is the filling process. Many FBOs and refuelling agents use a ground wire when filling an aircraft. But in some cases, fuel is transferred from a drum or can into an aircraft. Here, a jumper wire is a good safety precaution to ensure that the charge is dissipated. If you use a metal funnel with metal cans, make sure that the can, funnel and plane are always touching during transfer. With metal containers, the electrical charge is dissipated to the conductive container where it can be discharged by a ground wire or contact. In plastic containers, there is no good electrically conductive path to dissipate the charge. Although some people put metal strips into the plastic container, we would recommend the use of metal containers with a good jumper wire.

It's the safer way to go.

**Should I position my propeller horizontally or vertically when my aircraft is parked?**

Generally, 2-bladed propellers should be positioned horizontally when the aircraft is parked. With fixed-pitch wooden propellers, this prevents moisture from accumulating in the lower blade, causing imbalance and vibration when the engine is running. For constant-speed propellers, parking the blades horizontally will also help prevent water from collecting around the blade root seal, where it could leak into the hub and cause corrosion. Water and corrosion inside the hub can also result from inappropriate washing procedures; use of



pressure washers to clean constant speed propellers can force water past the blade seals into the hub, and should be avoided. Correct positioning of the propeller, careful cleaning and frequent regreasing of constant speed hubs will help prevent corrosion and keep the propeller mechanism in good condition.

### Why does my engine rust, even though I fly often with correct temperature gauges?

Pilots are always taught to "trust your gauges," which is a critical lesson, especially when flying IFR. Most of us apply this lesson to our engine as well. However, another part of this lesson should be to check the calibration of all instruments periodically, including oil temp, tach and oil pressure gauges. Let's remember that quite a few general aviation aircraft are over 20 years old. So it's not surprising to hear numerous reports of tachs being off by several hundred RPM and temp gauges being off by 10, 20, or even 30 degrees. It's important to have your gauges checked and calibrated periodically. One method used is to put marks on the oil temp gauge so that the "preferred" range can be easily seen. (The "green" band on many oil temp gauges starts at just over 100°F, which is okay for taking off, but too low for normal cruise.) Remember, oil temperature is one of the most critical parameters to be measured and controlled.

### How important are baffles and seals to cylinder temperature?

Baffles and seals are critical to keeping an engine cool, yet they're often overlooked. When you're

flying, air enters the cowling and creates static pressure above the engine. This pressure then forces cool air down through your cylinders and oil cooler to the lower-pressure areas below and behind the engine. From there, the air travels out through the flaps or other flaring openings. What's important to consider is that there is only a given amount of air coming in through the cowling at any given time. If your baffles are broken or misshaped, the amount of air going past a particular cylinder or area will increase. And if you increase airflow in one area, then airflow past other cylinders and the oil cooler will decrease, leading to higher temperatures in some parts of the engine than others.

Seals can create similar problems. If your seals aren't in good condition or aren't properly adjusted, they'll allow air to bleed out, which can reduce static pressure and cooling. So what can you do? Whenever you install a new engine, always have the baffles checked. Also, as part of your periodic inspections, check all the seals for fit and condition. If the seals aren't soft and pliable, replace them. Do this if your oil or cylinder temperatures seem abnormally high as well. Also, check how the seals fit against the cowling. If there are noticeable gaps, adjust the seals to reduce air leakage. And be sure to inspect the holes at the rear of the cowling for excessive leakage. If your cylinder heads still run hot, it may be necessary for you or your mechanic to check the static air pressure above the engine during flight. The spec should be available from your airframe manufacturer.



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