Checking Fuel Samples

CHECKING FUEL SAMPLES

How to make sure the gas is good before you go

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One of the first things we learn to do on an aircraft preflight is check the fuel. Using a fuel cup, we draw a sample from each fuel drain or sump, check the color (blue for 100 LL), and check for water and other contaminants. Usually, this does the job, but a few problems can go undetected by this simple fuel check. Here are a few additional tricks to help you perform a more thorough check and give you added peace of mind.

Rock and roll

Fuel systems are designed with sumps at the low points in each tank and in the system. Pilots use these sumps to remove water and other contaminants that settle out of the fuel. But don't be lulled into believing it always works. The fuel tanks in some aircraft, such as the Cessna 182, are lined with rubber bladders, and wrinkles in these bladders can trap water and prevent it from reaching the sump.

The wrong stuff

One of the most insidious hazards in aviation is misfueling a piston-powered aircraft with jet fuel. The best way to prevent this mistake is to supervise the fueling process. You can also ensure you won't be a victim of misfueling with these simple tests. First, do a touch test. Pour a small amount of the fuel on your finger. Avgas evaporates in seconds, causing a cool feeling. Water evaporates less quickly. Jet fuel hardly evaporates at all, and it leaves an oily residue.

Another way to test for the presence of jet fuel is to put a few drops on a piece of plain white paper. If jet fuel is present, it leaves an oily ring at the edge of the wet spot, and this ring remains after the avgas evaporates.

You can also check the fuel by pouring a small amount on dry pavement. If you find water in your sample, it will bead up in droplets because of surface tension. If bubbles form, step on them. Air bubbles pop but water drops remain. If the sample is all water, it forms a distinct puddle, whereas avgas will continue to spread.

How to smell trouble

Odor is another way to check the fuel. You might detect the presence of jet fuel by a kerosene smell; or you if you don't notice the characteristic smell of avgas, the entire sample may be water. Just be careful because water can carry a slight avgas odor if it has been in contact with avgas. Your fuel should have a strong avgas odor.

Night moves

When you check a fuel sample at night, hold the sample against a white backdrop, such as the fuselage, and shine a light on it from the side. The white backdrop makes it easier to detect the color of the fuel, and a light shining from the side illuminates debris and contaminants more readily.

Too cool for fuel

Remember that water freezes when temperatures fall below 32 degrees F, so water in the fuel may no longer be a liquid. When you check the fuel in cold weather, look for small ice crystals that slowly precipitate to the bottom of the fuel sample.

Sometimes, ice in the fuel system can cause more problems than water. Ice crystals can block a fuel filter, and water in a fuel system has been known to freeze a fuel selector valve in one position. If water freezes in a fuel tank, you may draw a perfectly good fuel sample, but after the ice thaws, you might still find water in your fuel. If you expect the weather to turn cold, sump the tanks before the mercury hits the freezing mark.

Ice in the fuel system doesn't happen in cold climates only. Even in warm latitudes, temperatures aloft can often sink below freezing, fouling the fuel systems of unwary aviators.

Avoiding the problem

There's no way to completely eliminate the problem of contaminated fuel, but you can take precautions to reduce the potential.

Finally, you should always purchase fuel from a reputable FBO to ensure the strictest quality standards are observed.

Fuel contamination can be a dangerous problem, especially if symptoms appear after takeoff, but a few extra minutes in the preflight can help us avoid the pitfalls, so we can fly with confidence.