

# Rust Prevention

When you aren't flying as much as you'd like.

## 1. Use an oil with the most effective rust inhibitor.

Oils prevent rust by providing a barrier between moisture and metal. However, given time, moisture will diffuse through an oil layer, contact the metal and promote galvanic corrosion or rust.

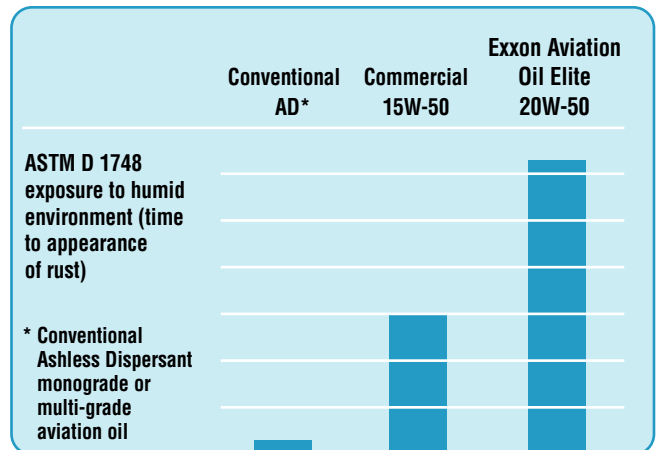
Oil manufacturers often enhance an oil's ability to prevent rust by adding rust inhibitors — additives that are dissolved in the oil. They are molecules containing polar heads and a water repelling tail. The polar heads form non-permanent bonds with the metal (by non-permanent, we mean they can be wiped away), providing, if you will, a second layer of protection against moisture penetration. Moisture will still diffuse through both the oil layer and the rust inhibitor layer — but it will take longer because of the water repelling nature of the additive, which offers you greater protection against rust.

The problem is that not all oil/rust inhibitor combinations are as effective as others. So how do you evaluate the relative effectiveness of different oils at preventing rust?

We suggest comparing oils by their relative performance in the humidity cabinet test (ASTM D 1748). The humidity cabinet is a scientific comparison in which sand-blasted steel panels previously soaked in various oils are exposed to 100% humidity at 120°F. The time lapse until the first appearance of rust is then measured.



Results from the humidity cabinet may surprise you. Panels soaked in monograde oils show the first signs of rust and are often completely rusted very rapidly. Multi-grade oils fare better, and the most effective by a substantial margin is Exxon Aviation Oil Elite 20W-50.



As displayed above, the relative performance results of the ASTM D 1748 test illustrate that Exxon Aviation Oil Elite 20W-50 provides much better rust protection than other aviation oils.

## 2. Calibrate your temperature gauge.

Oil temperatures that are “in the green” are not necessarily hot enough to boil moisture away, so check your gauge for accuracy. Some gauges are marked with actual numbers. Some are not. If your gauge is marked, it should read approximately 212°F when the probe is placed in boiling water. If your gauge is not marked, a good practice is to mark your oil temperature gauge with a reference mark at 180°F.

It is generally recommended to maintain oil temperature in the 180°F to 185°F range during flight. This range will allow moisture that has accumulated in the oil on the ramp to boil away during flight. When your aircraft sits on the ramp or in the hangar, the engine heats up during the day and cools down at night. The cooling process condenses water vapor in the engine, forming moisture, which drains into the oil. This moisture can, of course, lead to rust on engine components.

Because Exxon Elite has excellent thermal stability and oxidation properties, we suggest you run your oil at a slightly higher temperature — about 190°F. Any condensate will evaporate more rapidly and more thoroughly at this sump temperature.

### 3. Analyze your oil every 60 days.

We all think we're getting the water out of our oil every time we fly, but there's only one way to know for sure! Send a sample of your oil to a qualified laboratory every 60 days whether you've flown much or not, and ask them to test it for water content.

If the lab says you have water in your oil, you may need to raise your sump temperature or change your oil more frequently.

### 4. Change your oil every four months (even if you haven't flown 50 hours).

Get the water out! You can only be sure that you've removed all of the water in your oil by changing it.

Get the lead out! Because it contains lead, the combustion of aviation gasoline leaves lead in the oil in your crankcase. Oils are designed to uniformly suspend this lead and other contaminants throughout the oil so that when you drain it all these impurities go out with the oil. If your aircraft is sitting for extended periods, lead and other impurities may fall out of suspension — right onto your engine parts!

Get the acids out! When you do fly your airplane, acids are created in the combustion chamber and contaminate the lubricant. These acids remain in solution in the oil during periods of inactivity and can lead to rust because they tend to carry water to the metal surfaces. These acids can also corrode the yellow metals in your engine.

Changing your oil on a calendar schedule as well as a flight hour schedule helps ensure you get contaminants out.

### 5. Change your oil immediately before any extended period of inactivity.

If you have a planned period of flying inactivity, make sure you leave fresh oil in the crankcase. Change your oil immediately before the inactive period, start the engine to circulate this fresh oil throughout the engine and warm it up for five or ten minutes.

**Exxon Aviation Oil Elite 20W-50 is available at FBOs and distributors nationwide or by calling 1-800-44-Exxon (1-800-443-9966). For more information, visit [www.exxonmobilaviationlubes.com](http://www.exxonmobilaviationlubes.com).**

#### If you aren't flying as much as you'd like:

Use oil with the most effective rust inhibitive capabilities.

Calibrate oil temp gauge.

Sample oil every 60 days (and ask lab to test for water).

Change oil every four months (even if you haven't flown 50 hours).

Change oil immediately before any extended period of inactivity.



*Chances are you aren't flying as much as you'd like. Protect your airplane's piston engine against the ravages of rust with Exxon Aviation Oil Elite 20W-50.*

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