AeroShell
Oil W 15W-50 Multigrade Oil
AVIATION OIL

FOR SPARK IGNITION PISTON ENGINES

"The Best Performing Multi-grade in General Aviation."

AeroShell's High Performance Multi-grade 15W-50

AeroShell Oil W 15W-50 is Shell's premium piston engine oil. Being a multi-grade it is designed to be used in any climate, year round, unlike the more commonly used single grade oils.

AeroShell Oil W 15W-50 has been used by aviators for over 15 years and has the most in-service experience of any semi-synthetic multi-grade.

Why buy AeroShell Oil W 15W-50?

The benefits for you:

- Protects your engine faster after cold start-up than any other piston engine oil.
- Best low temperature performance of any aviation piston engine oil. This is especially important in winter conditions.
- Reduces Fuel Consumption by up to 5%.
- AeroShell uses carefully blended base oils, which give proven load carrying performance whilst preventing sludging.
- Takes advantage of modern synthetic oil technology.
- Advanced anti-wear and anti-rust additive package.
- Most in-service experience of any semi-synthetic multi-grade.
- Compatible with AeroShell W100+.
- Superior to all mineral multigrades, with better temperature, load carrying and stability performance.

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Dear Aviators

Although we are not quite in the throws of Winter yet, it is a good time to start to think about and plan what you should be doing in the colder months of the year with regards oils for your engine. Therefore in this Tech Talk 24 issue Iain Jack, GA Market Development Manager Shell Aviation Lubricants looks into proper oil use in Winter conditions. (Iain is a member of the AeroShell team with 20 years experience in the lubricants business)

Happy Flying

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AeroShell TECH TALK

Oil Strategy for Winter

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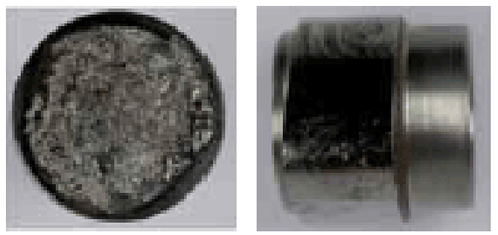
The onset of Winter brings shorter days and weather conditions that should prompt every pilot to think about their engine and the oil in it.



Engine wear that can result from incorrect wintering procedure.

Colder weather causes an increase in condensation. The resulting water combines with the engine oil and by-products from the combustion process to form an acidic environment for the internal engine components.
Why? Aviation engines still use a fuel that contains a large amount of lead. Avgas 100LL contains about eight times the lead content of even the old leaded road fuels. This poses a problem for the oil.

Lead by-products, found in the exhaust blow-by gas and in raw fuel, find their way over time into the oil. These quickly form sludge deposits. To counter this, a bromine-based lead scavenger is added. Unfortunately, if water is present, a reaction occurs which leaves an acidic characteristic within the oil. The resulting rust formation on parts such as cams, lifters and cylinders will cause obvious concern.

Equally worrying is the resulting iron oxide contained within the oil. Once the engine has been started, it will travel through the entire oil system. While some of the larger pieces will filter out, many of the smaller pieces will remain in the oil and can act as a grinding paste on critical surfaces, causing increased wear, reduced engine life and potentially higher maintenance bills.
If you are able to fly at least every two weeks, the problem will evaporate – literally – as the engine temperature rises. You are actually boiling the water off during flight. If you are not certain that you will be able to fly this regularly, it is extremely important that you drain the old engine oil and replace with fresh clean oil.
A good rule of thumb for changing aviation piston engine oil is to change it every four months. There are of course at least two exceptions:

- **More frequent flying –** If you are able to fly frequently with correct oil temperature, you should adjust the four- month rule accordingly. Change your oil after 50 hours if you have flown the hours in less than four months. If your engine doesn't have an oil filter, change it after 25 hours. Always remember that the four- month rule is the most critical.

- **Less frequent flying –** It is a fact that over recent years, the annual flight hours of many leisure/private aircraft have decreased. And inactive engines will form rust. Even though some aviation oils contain corrosion inhibitors, they are unable – contrary to some company's marketing claims – to provide an adequate defence to a corrosion attack of this type. These products are designed for low-use aircraft, not extended periods of inactivity. Specific products such as AeroShell Fluid 2F or 2XN were developed for this issue and should be considered if you plan to lay up your aircraft for four months or longer.

Engineers commonly see failed cam lobes and followers caused by the wrong oil for the season. Photo: Loren Rodgers/Shutterstock

The second issue is using the grade of oil suitable for the weather. Engineers commonly see failed cam lobes and followers resulting from the operator failing to change the oil with the seasons. Do you leave W100 in your engine when winter comes around and the temperature drops?

Enginer maker Lycoming gives the following temperature ranges for single grade oils:

- 100 Grade oil (SAE 50) – above 60˚F (16˚C).
- 80 Grade oil (SAE 40) – 30˚F to 90˚F (-1˚C to 32C).

All oils become thicker as the temperature is reduced, but the relationship is an exponential one, meaning that differences between grades are modest at high temperature, but become very large at low temperature. This is significant as the use of the incorrect grade of engine oil can cause engine damage on start-up as the oil is too heavy, becomes syrup-like, difficult to pump and takes a long time to reach all areas of the engine. The aim of using a 'thinner' oil during colder months is to ensure that the oil achieves the correct viscosity and to provide the optimum lubrication when the engine is at operating temperature.

Single-grade oils have been successfully used for many years in aviation engines, but the key to making them work properly is to be careful to use the right oil for the weather. This should cause little inconvenience to the operator who follows the four-month rule.

AeroShell Oil W80 and AeroShell Oil W80 Plus for lower-use aircraft are perfectly suitable for the winter months.

One of the other main advantages of single-grade oils is that they are cheaper, but we are seeing a growing trend of operators using single-grade oils in the summer months and then changing to a multigrade for optimum oil circulation during the winter.

The main reason for this is 'cold start'. Poor oil circulation during start-up is recognised as a main cause of engine wear. Controlling the time of optimum oil circulation is of primary importance when designing an oil to be used in any climate.

The best way of explaining this is to refer to the '15W' part of the product name AeroShell Oil W15w/50. This refers to the low temperature performance of the oil. In recent testing, an engine and its oil were cold soaked to 0˚C. Upon start-up, oil pressure readings were taken at the front and rear (prop-side) oil galleries as a function of time. The results showed that AeroShell Oil W15w/50 achieved full oil pressure at the front gallery in less than half the time of a competing semi-synthetic 20W/50 and achieved full oil pressure at the rear gallery a full minute sooner than the same 20W/50 oil. It is reasonable to conclude that oil performance of full lubrication a minute sooner at modest winter temperatures will significantly limit the amount of wear on engine start-up.

This real-world performance, combined with a load-carrying additive and a corrosion inhibitor, makes AeroShell Oil W15w/50 the best-performing multigrade currently available in the market, even after 14 years of use and over 200 million flight hours. It's a compelling reason for many operators choosing a semi-synthetic oil such as AeroShell Oil W15w/50 for winter and all-year use.

AeroShell straight mineral oils are approved to the SAE J-1966 former MIL-L-6802 specification. AeroShell Oil W single grade and antiwear, anticorrosion AeroShell Oil 15W/50 are approved to the SAE J-1899 former MIL-L-22851 specification. As engine manufacturers state that only oil approved to this specification should be used (e.g. Lycoming Service Instruction No. 1014M) it surprises us – and may surprise readers too – to know that certain aviation engine oils available in the market place are not approved to this specification.

(This article is based on generally opposed series aircraft engines such as Textron Lycoming and Teledyne Continental Motors. For rarer types and 'vintage' aircraft engines, there may be differing issues to consider when choosing the correct oil.)

Happy Flying.

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