

Lubricating Systems

filters and oil passages and generally causing mayhem within the engine. Metallic ash detergent oil is no longer used in aircraft engines.

On the other hand, ashless-dispersant (AD) oil, meeting MilSpec MIL-L-22851, has practically taken over the reciprocating engine aircraft market. By using a nonmetallic polymeric additive, AD oil has done away with the carbon-forming problems of mineral oil without adding the ash-deposit problem of detergent oil. The dispersant additive causes particulate matter to repel one another, preventing sludge. At the same time, the dispersant holds the separated matter in suspension until it is removed when the oil is changed. Originally there was concern that the free-floating particles would act as an abrasive, forming a sort of flowing sandpaper that would wear out parts as it flowed by them. Experience has shown it to be quite the contrary. AD is such a good lubricant that many manufacturers require a new engine break-in period using mineral oil.

Synthetic Oils

With reciprocating engines operating at higher temperatures than ever before, yet being subjected to varying environments, new types of lubricants were proposed to satisfy the new needs. Synthetic oil is an attempt to solve the problem of large temperature variations. For instance, a synthetic oil can have the same viscosity at -20 degrees F as a non-synthetic AD oil at zero degrees F. Because synthetic oil has a lower internal friction than petroleum-based oils, it has excellent lubricating qualities at very low temperatures. In fact, the observant pilot would notice a 3–5 psi lower operating pressure than petroleum oil.

Engines using synthetic oil have started without preheat in temperatures as low as -40 degrees F. While there is definitely the potential to all but eliminate preheat, most manufacturers still recommend preheating the engine in extremely low temperatures. Nevertheless, it certainly means greatly reduced preheats, and perhaps the best part is no longer having to drain the oil just because the climate changes. Synthetic oil is honestly an all-weather oil. There are additional advantages to synthetic oil.

Synthetic oil allows a longer time between oil changes because it produces less oxidation at high temperature and has better wear characteristics than straight mineral oil. Probably the best benefit for the occasional pilot/owner is it adheres to metal better than other types of oil—certainly for weeks, and even months! This translates into longer engine life because it protects the cylinder walls from corrosion and provides instant lubrication on start-up, even for planes that aren't flown regularly. There are disadvantages, though. It has a strong tendency to soften rubber and resin products, so you have to be very careful about spillage and leakage. It is also much more expensive than the other types of oil, and while the extended oil change period tends to compensate for the added expense, a leaky oil system can literally run into big money.

It is a common misconception that you can't mix different brands of oil. Within the basic categories, all oils are compatible. All ashless dispersants meeting MIL-L-22851 are compatible with each other; they are also compatible with straight mineral oil. If, however, the engine is high time and has always used straight mineral oil, changing to