

NEW OILS & OLD CARS

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In days long ago, there was little question about what oil to use. One used light weight oil in the winter and heavy weight oil in the summer. Then, detergents were added so another choice was introduced — detergent or non-detergent. After further development by the oil chemists, multi-viscosity oils were offered eliminating the need to change oil weights with the seasons. And, that situation remained the same into the late 1970s.

The late 1970s saw the introduction of synthetic oils, e.g. Mobil 1, based on Group IV polyalphaolefin or Group V ester to improve oil longevity. Oil types thereafter remained unchanged for several years. Beginning in the early 1990s, many changes to engine oils have occurred as engine manufacturers and oil industry chemists worked to comply with environmental regulations and to increase fuel mileage. Most of the changes were "backward compatible," i.e., oils developed for modern engines could be used with older engines for which they were not purposely designed. The advent of the latest type — SM marked on the container — compromised backward compatibility. Generally, it is no longer good practice to use SM marked oils in collector car engines. I will provide a brief overview of the information on engine oil intended to help collector car owners. Extensive information is available and links to that information on the Internet are included at the end of this article.

A couple of notes to begin. The information provided is for those who regularly drive their collector cars, not those who engage in competition events with their collector cars. Also, I have no preferences regarding synthetic oils because their extended life benefits are of little consequence for most collector car use. It is interesting that today's synthetic oils are generally not based on the Group IV polyalphaolefin or Group V ester (the original base) since the mid-1990s. Then, a court decision declared the term "synthetic" a marketing term. Thereafter, synthetic oils could be made by hydrotreating petroleum base oils. Today, most synthetics are treated Group II or III petroleum base oils with perhaps a small percentage of Group IV or Group V components.

Latest Developments

The purpose of engine oil is to provide a physical barrier (an oil film) that separates moving parts to decrease wear and friction. It also serves as a cooling agent. More than 95% of the oil is the base oil with the rest being a series of additives. Detergents carry away wear particulates and other contaminants. They also assist in neutralizing acids formed by the breakdown of oil and combustion byproducts. Dispersants control contamination from low temperature operation. Inhibitors control corrosion, rust, and foaming. Viscosity index improvers control the viscosity of multi-grade oils. Pour point depressants

improve cold temperature fluidity. Anti-wear additives make up the difference.

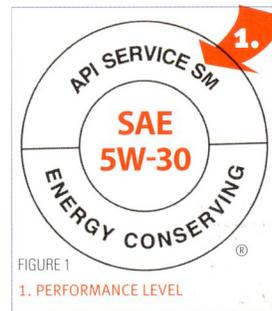
In the quest to improve car fuel mileage and avoid polluting the environment, engine designers have made a number of changes in recent years. The use of roller lifters instead of flat lifters in pushrod engines or overhead valves requiring springs of less pressure and improved bearings are among the more notable changes in the quest to reduce friction and enhance fuel economy. Computer controls and better catalytic converters address the pollution problem. These changes in engine design have been accompanied by demands on oil suppliers to provide different engine oil.

Of primary concern to collector car owners has been the steady reduction in the anti-wear additive ZDDP (zinc diakyl dithiosphosphate) as oil types have evolved from SH to SJ to SL to the current SM. Both zinc and phosphate are key to preventing wear. Unfortunately, they also contaminate catalytic converters when emitted in the engine's exhaust. The two changes work in combination, modern engine design with less opportunity for wear enables a reduction in the anti-wear additives which pollute. Oil for collector cars should have 0.12 to 0.14% (also stated as 1200 to 1400 ppm) of each of the main anti-wear chemicals, zinc and phosphorous. This concentration of zinc and phosphorous was reported in the SAE technical paper in 1977 entitled, "Cam and Lifter Wear as Affected by Engine Oil ZDP Concentration and Type." With the SM specification oils, these anti-wear chemicals have been reduced to 0.06 to 0.08% or reductions approaching 50%; the ultimate goal is their complete elimination.

What Should A Collector Car Owner Do?

Do not use SM type oils if you regularly drive your car for a few thousand miles. The type of oil is found in the top half of the API (American Petroleum Institute) "donut" on each container (See Figure 1). Also avoid oils which say "Energy Conserving" in the donut. You can use SM type oil by adding one-half ounce of GM's EOS (Engine Oil Supplement) for each quart of SM type oil installed to improve its anti-wear characteristics. Do not add more; more is not better.

Figure 1



The arrow indicates the performance level in the upper half of the donut; "S" stands for "Service" and "M" is the performance level. On diesel oils the same position will say CI-4 where "C" stands for "Commercial" and "I-4" is the performance level.

Another alternative is to use CI-4 HD oil for diesel engines. These oils have more anti-wear additives. However, be sure to check the container as a new diesel oil, CJ-4, has been introduced to go along with the new (January 1, 2007) low-sulfur diesel fuel. Given the preponderance of pre-2007 diesel engines operating, the CI-4 oil should be available for quite some time.

Here are a few more recommendations that have served me well over the years. Unless an engine has been completely

rebuilt and thoroughly cleaned in the process, do not switch to a synthetic if it hasn't been used in the engine and do not switch to a detergent-containing oil if only a non-detergent oil has been used. I regularly use 15W40 multi-viscosity oil as it imposes no limitation on starting down to 15 degrees F and provides good protection for hot weather driving.

Summary

I have just hit the essential points of this important issue for collector car owners.

However, engine oil design and application is a complex issue. For those who want to know more, a couple of Internet links are suggested — <http://lubricants.s5.com> and <http://www.Lnengineering.com/oil.html>. The first provides a good overview and the second is more detailed. Although the second focuses on Porsche engines, the information it contains and the associated references can be used for all collector cars.