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Synthetic lubricants excel in temperature extremes.

Perhaps better known for their cold-temperature benefits, synthetics are equally beneficial in extreme heat.

Summer is on its way, and thank goodness; this winter has really been hard on everything! Wildlife, water mains, heating budgets, people – and our vehicles – have all suffered through this winter. As of Feb. 11, 2014, Duluth, Minn. marked 23 consecutive days with a low temperature below zero. The last day a low temperature was zero or above was Jan. 19, with a low of 13°F.

We often think about synthetics' low-temperature properties – maintaining flow in sub-zero conditions to lubricate vital components and ensure startups on the coldest mornings – but with a hint of spring on the horizon it's time to get ready for summer. One of the many benefits of synthetic motor oils is their excellent all-weather performance. What happens to lubricants during the dog days of summer in the desert Southwest where daytime temperatures routinely climb above 100°F? Driving a vehicle under these conditions stresses lubricants also, but in different ways than driving in subzero temperatures.

Hot operating conditions subject oils to stress that can result in sludge and varnish formation in your engine and transmission, resulting in major damage. There are a bunch of tests that can be run on used oil to help predict sludge and varnish formation, including oxidation, nitro-oxidation, viscosity increase and total base number (TBN) depletion. If you are not interested in becoming a used-oil analysis expert, make sure to pick lubricants proven to withstand the heat. One of the main differentiators of lubricants is how long they can effectively fight sludge and varnish formation. In the southern half of the United States, the chemical reactions that create sludge and varnish are

accelerated with high temperatures. As a general rule, chemical reaction rates, including sludge and varnish formation, double with every 10°C (18°F) rise in temperature. So if you live in Phoenix, your vehicle lubricants better be designed to hold up to these accelerated reaction rates. It takes detailed knowledge of lubricant chemistry and field experience to get it right.

Keeping surfaces effectively separated to reduce friction is another concern down in Phoenix during the summer. Reducing friction will reduce the amount of heat that is generated, which will lower the operating temperature of the component. Anti-wear components help maintain this separation of surfaces, but lubricant thickness is the main mechanism.

When oil gets too thin, friction and heat are generated. Since lubricants generally thin as temperatures go up, they need to be designed to provide effective separation at the highest expected operating temperature. An oil's base stock and formulation influence this property, called viscosity index (VI), which indicates the change in oil viscosity in relation to temperature. Oils with high viscosity indices have smaller changes in viscosity due to temperature changes than do oils with low viscosity indices; therefore, it is desirable for oils to have higher viscosity indices. As you might expect, synthetic motor oils have higher viscosity indices than conventional mineral-based oils do.

We also rely on engine oil to absorb heat from the contact surface area and transport it to a location where it can be safely dissipated (an oil cooler or

sump). As oils age, they cannot carry away as much heat, so temperatures increase, accelerating the chemical reactions which result in sludge and varnish.

Hot summer temperatures were part of the challenge facing AMSOIL Signature Series Synthetic Motor Oil and Signature Series Multi-Vehicle Synthetic Automatic Transmission Fluid during the 2011-12 Las Vegas Taxi Cab Field Study. Over the course of 18 months, test vehicles operated in the fleet's service area of Las Vegas up to 24 consecutive hours daily, accumulating more than 7,000 hours of service. Like most taxi cabs, the vehicles operated in stop-and-go conditions where excessive idling is the norm, but they also faced the grueling summer temps of Vegas where daytime highs often exceed 100°F. Hour after hour, day after day, under such punishing conditions, AMSOIL lubricants proved up to the task. Engine and transmission components from the test vehicles were later examined and found to have minimal or no notable wear, even after practicing extended drain intervals.

Few of us operate our vehicles under such severe settings, but it is reassuring to know that AMSOIL synthetic motor oils provide outstanding wear protection and superior high-temperature performance in the harshest conditions. The next time you're driving during one of those summer scorches or battling stop-and-go traffic, be assured that AMSOIL synthetic motor oil is working hard under the hood to keep your engine running cool. ■

From the President's Desk

With new Dealers and Preferred Customers coming on board every day, I feel it's necessary to occasionally provide a little AMSOIL history. In doing so, I am hopeful that those just beginning their AMSOIL businesses and those Preferred Customers who have become loyal to our products will gain additional appreciation for the leadership role we have earned in the industry.

What many people don't realize is that my research on synthetic motor oil began much sooner than the 1972 introduction of the original AMSOIL 10W-40. In the early-1960s, armed with the knowledge that synthetic oil was the only type of oil capable of withstanding the tremendous demands of the engines in the jets I was flying, I reasoned why not bring that same technology to the automotive world? I was convinced it could extend the lives of automobile engines.

I submerged myself in the study of lubrication and began formulating and marketing synthetic oils of my own. After several years, thousands of hours of intense research and a variety of oils under a variety of names we ultimately created the original AMSOIL 10W-40 Synthetic Motor Oil. That oil was tested at Southwest Research in San Antonio, Texas and became the first synthetic motor oil to "meet or exceed API Service Classification SE engine test targets." A clearly defined benchmark had been established. AMSOIL motor oil was tested, proven and documented by a single authoritative source, and for the first time a commercially available synthetic motor oil had been officially designated for use in automobile engines. The introduction of AMSOIL synthetic motor oil in 1972 launched the synthetic motor oil market.

Nothing good in life, however, comes easy. The major oil companies and automobile manufacturers refused to recognize the superiority of our product. They fought us every step of the way. Then gradually, things began to change.

Our Dealers were making progress and other circumstances came together to advance our cause.

In 1974 when Mobil 1 was introduced, many Dealers expressed concern. They feared that with a second synthetic motor oil now on the market, our sales would suffer. I knew, however, that Mobil's near-limitless advertising budget would ultimately work in our favor. They would spend millions to help educate the public on the benefits of synthetic oil. They did, and we grew.

It was about this time that gasoline was in short supply and prices soared. Fuel economy became a major concern, and gas-guzzlers of the sixties were being replaced by more fuel-efficient compacts. As the need among consumers to cut fuel costs increased, our Dealers capitalized with sales of lubricants that actually did make a difference.

Another event impacted the demand for synthetics. This one more subtle, perhaps, than the Mobil 1 introduction, but significant nonetheless, especially as an indicator of where the industry was headed. In early 1991, General Motors halted sales of the Corvette ZR-1. Eight engines had seized at its Bowling Green, Kentucky assembly plant. The temperature had dipped to slightly below freezing and, at start-up, hard-to-pump motor oil did not reach the front camshaft bearings. They were destroyed by lack of lubrication.

GM responded by requiring the use of synthetic oil in the Corvette. It was the first time an American auto manufacturer had required, not just recommended, the use of synthetic oil as a factory-fill. It was clear to me then that GM's decision was just the beginning. More

factory-fills would follow. The door had just opened a little wider for AMSOIL Dealers.

Not long after the Corvette was treated to synthetic oil, virtually all the other oil manufacturers began introducing synthetics of their own. They, like Mobil, spent millions advertising their "ground-breaking" new products. The floodgates had opened, and as awareness among consumers reached an all-time high, our sales climbed.

Today, of course, consumer awareness has never been greater, and our reputation as the industry pioneer is firmly established. The AMSOIL track record speaks for itself. We have set the standards for lubricant performance and will continue to push those boundaries.



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