



From the Garage

by Paul Hunter

New Motor Oils Are Bad for Older Engines with Flat Tappet Camshafts -The Zinc Factor

Engine oil seems so simple. It's slippery. It keeps metal parts from fusing together. It's messy, especially when it has been squeezed, slung, and sprayed around the inside of a hot engine for thousands of miles. And after it has been inside an engine for a few thousand miles, it seems dirty, worn out, and ready for disposal. But engine oil never wears out. It gets contaminated from combustion byproducts and it loses its additives to heat and pressure, which is why it must be changed from time to time. Otherwise, oil lasts virtually forever.

Oil is your engine's life blood. Not only is oil a lubricant, it is also a coolant as it transfers tremendous amounts of heat because it is in direct contact with the hottest components in your engine. Main, rod, and cam bearing journal temperatures can run upward of 400 degrees in normal operation. Conventional engine oil begins to break down around 260 degrees (synthetic oil is good up to 300 degrees). Above 300 degrees, engine oil begins to cook and stops being an effective lubricant. Oil survives the extreme heat because it keeps moving, getting rid of heat as it flows. This is why proper bearing journal clearances are crucial to engine survival. Oil must keep moving in order to both lubricate and transfer destructive heat.

One of the worst things you can do to your engine is start it. During those first few seconds of operation, there's no oil pressure at the bearings nor is there oil splash to lubricate other moving parts. Imagine crankshaft journals and bearings, not to mention piston rings and cylinder walls, getting together under high pressure before lubrication reaches them. This is where most engine wear comes from.

Lubrication is nothing more than a liquid wedge (cushion) between moving parts to prevent friction. But this alone doesn't guarantee success. Because liquid cannot be compressed, it is the perfect type of lubrication because it prevents metal-to-metal contact. When this film is pressurized, it creates a solid barrier between moving parts. Think of the liquid wedge like you would tires hydroplaning on wet pavement. Tires move over the surface without actually touching the pavement.

This leads us to the main point of this article--zinc, or more specifically the lack of it in today's oils. Oil companies started adding ZDDP (zinc dialkyldithiophosphate) to engine oil back in the 1950s to help reduce wear and tear during engine start-up. How important is ZDDP to your classic Model A engine? It reduces bearing and journal wear by a factor of 20. It's that important.

ZDDP acts as an anti-wear barrier with great staying power when we shut an engine down. It does essentially the same job tetraethyl lead did for exhaust valves and seats before it was removed from gasoline in the 1980s to reduce air pollution. Lead acted as an anti-wear element between valve and seat. When the Environmental Protection Agency (EPA) mandated lead's removal from gasoline, it caused quite a stir in the classic car community because enthusiasts feared excessive exhaust valve and seat wear. The solution was the installation of hardened exhaust valve seats in older iron cylinder heads.

Without zinc in the oil, wear for vintage engines with flat tappet cams increases exponentially. In fact, it is alarming how quickly it happens and how much damage it does.

Zinc is crucial not just for cold start-up, but extreme conditions that make heavy-duty engine oils necessary for reliable operation. There's no magic in heavy-duty engine oil, just higher levels of ZDDP to help reduce wear.

The first thing you want to know about engine oil is if it has an "SM" rating, which indicates greatly reduced or zero zinc levels, which makes it harmful to your classic Model A engine. Do not use engine oil with the "SM" rating. Or, if you're going to use engine oil with the "SM" rating, use a zinc additive that will maintain proper ZDDP levels.

For those with access to the Internet check out - <http://www.zddplus.co.nz/index.html> Castrol Edge Sport 25w-50 is specifically part of their performance range of engine oils for push rod, flat tappet engines. It has demonstrated excellent wear protection on cam profiles. Although rated API SG it incorporates the latest detergents and dispersants for good engine cleanliness, contains 0.10% Phosphorus and retains components for strong wear protection. The off-the-shelf product is widely used in competition engines. Here's to a happy engine, treat it well and it will look after you, give it a birthday regularly and especially after a long hard run as with our older cars some burnt gases can enter the crankcase, this contaminates the oil with soot, water and some acids, oil filters help clean the oil of some of this contamination, but not all Model A's run oil filters. I would recommend that you do your own research into the engine oil that you are using and ensure that it will provide protection for your Model A, please do check out the information that is on the Internet as well as the ZDDPlus website. I will write up an article on the API ratings for the next newsletter

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The above article is a combination of published data readily found on the Internet, to the authors my thanks.