

## Engine Oil Changes as of 2006

for what its worth.....

If you poke around on the "Bob is the oilguy" website <http://www.bobistheoilguy.com/index.html> you're likely to find some of the questions I asked. With regards to our old engines and current products the general results of all my inquiries are:

- EPA got after the car makers, catalytic converters were not working at high efficiency long enough
- Car makers got after the catalytic converter makers, what's up
- Car makers and converter makers came up with the zinc dialkyldithiophosphate (ZDDP) as the "bad guy". Zinc is a heavy metal that bonds to the active catalyst beads in converters to degrade their performance over time. Each time a piston leaves a trace of engine oil on the cylinder wall, each stroke, a tiny amount of ZDDP gets burned and some of the residual zinc fouls the converter down stream. This is a very slow process but since the EPA wants at least 100,000 miles of full converter strength something had to change.
- The American Petroleum Institute (API) (the oil makers), car makers, EPA, and converter makers got together to determine what to do.
- The conclusion...GET THE ZINC OUT.
- Why was zinc in there in the first place? To reduce start up wear and high wear at extreme conditions (1960s solid lifter cams are extreme conditions these days). Most engine wear in a normal use engine is poor tribology (wear science) at start up before the unit reaches operating temperature. Wear is exponential below and above the designed temperature range, with significantly too cold being the worst case. I could find no one anywhere, even the oil companies I corresponded with, that would say exactly what the benefits were. In our case where I work I used to be the person that blended the oil we used in production and I was the only one on site with the secret recipe of what went into our oil package. ZDDP was used. What did it do? In our case it reduced crankshaft wear by a factor of twenty, said another way the units would run 20 times longer before getting to the wear limit. We considered that important. Back when I was picking an oil for a Shelby Mustang years ago I checked out a major brand of oil and found the only difference between their oil grades was the amount of ZDDP in the oil. I don't remember exact numbers but for affect, the \$0.15 per quart oil had maybe 0.05% ZDDP, the \$0.20 per quart something like 0.10%, and the heavy duty \$0.60 per quart oil had something like 0.35% ZDDP. In my discussions with them back then the level of ZDDP was the only difference and as you see they made a lot of profit on the heavy duty oil. ZDDP provided wear protection under too cold, too hot, and extreme loads conditions.

- What has EPA/API done? The latest oil specification (SM on labels) regular oils have had their ZDDP levels severely reduced THIS TIME. The EPA/API/car makers have the goal of getting it all out as soon as they can figure out what to use instead.

- So, why do I care if an oil is "SM" rated? I care because no oil company or independent expert / lab I could find would recommend a SM rated oil for a 1960s Muscle Car engine with iron camshaft and solid lifters. Why? None or not enough ZDDP. It was a friend that actually tipped me off that oil specifications had changed while I was not paying attention.

- How about speciality oils? Currently off road, diesel truck, racing, ATV, and marine oils (oils not intended for daily driver cars) are not subject to EPA/API ZDDP restrictions BUT new specifications are in the works for guess where-----California. Once all oil sold in California is low or no ZDDP the rest of the country will follow.

- How to protect your old design engines? Use products from smaller companies like Red Line, Royal Purple, et al. that offer speciality oils the big boys don't. These low volume speciality oils are expensive. Use additives, several big name and small private companies have started selling oil additives with various levels of ZDDP. Convert to roller cams, coated bearings, coated pistons, etc. like common in production engines designed to do without ZDDP.

- Postscript. I have been using Mobil 1 in my "toy" the past few years. I have some old bottles around still. I had not noticed that the last time I bought some the rating changed to "SM". New oils are made for new cars not 40+ year old ones. In my direct correspondence with ExxonMobil they explicitly said they do not recommend the current SM Mobil 1 for any 1960s engine. In fact, they had no SM oil (mineral or synthetic) they offered suitable for 1960s engines. Up until late 2005 they had rare racing oil with ZDDP that NASCAR used but ExxonMobil told me they took it off the market in fourth quarter 2005 and would replace it with something else this spring.

- Post- Postscript: The "MOLY" thing. All "moly" is not the same. Originally when a lubricant claimed it have "moly" as an ingredient it referred to an inorganic compound molybdenum disulfide (MoS<sub>2</sub>). It is not soluble in oil. It rides around in the oil until the oil filter filters most of it out. MoS<sub>2</sub>, when anhydrous (made and kept dry), is a material of tiny flat flake particles that slide easily over each other. MoS<sub>2</sub> works great as long as it is dry (wet it reacts with water and converts to a more sand like material) but there are EPA and OSHA problems associated with manufacture and use. So? So the oil companies have developed oil soluble organic compounds that contain molybdenum and don't get filtered out. This may be smoke and mirrors because there seems to be a very large disagreement about whether or not one particular compound or another actually does anything except be a marketing tool. The "moly" in one brand oil can be a completely different "moly" than in another brand. Oil companies are, because the money stakes are enormous, best secret keepers I know of so it may be years before any real consensus on the "organic moly" comes to light.