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My Understanding of The Basics of Motor Oils

I am not the oil expert, but I was asked to touch on Motor Oils for this month's article. Near the end of this article is a link to more detail in a longer "Oil" article, which is posted on our PACE web page. The goal of this is to somewhat explain my understandings of oils that lead to the decisions I made on which oil to use. Our Miata handbook specifies an oil to use, so I will keep that in mind also.

There are two basic types of Motor Oils. One is "Dino" or what we believe to be oil from Dinosaurs, and the other is Synthetic Oils. One is pumped from the ground and refined, and the other is sort-of man-made. In the food industry, we have Natural and Artificial flavors. Both are made from the same chemical compounds, it is just that some occur naturally, and some are compounded manually. Dino oil is pumped from the ground and refined, and Synthetic oil is compounded by man. Both oils are similar compounds, but different.

Dino oils still have some paraffins and waxes in them. Part of the additive package works to keep these from building up on the internal engine parts, and part of the additive package works on cleaning combustion deposits from the engine. Since Synthetic oils have little or none of the paraffins or waxes in them, the additive package lasts a lot longer, so you can run each oil change longer.

Our Miatas call for "multi weight" oils. The purpose of this is so the oil starts flowing quickly when the motor is cold. Then when the coolant and the oil get to the normal operating temperature (Around 212 degrees), it changes to a heavier weight, or thicker oil. This is so it lubricates the engine better under the stress of hard driving.

One thing to remember is that oil FLOW is what cools and lubricates the engine. Oil flowing thru the bearings and the earlier Miata hydraulic lifters is what lubricates the moving parts and carries away some heat from the internal parts. Antifreeze/coolant cools the cylinder walls, and the cylinder heads, but the oil helps cool the internal moving parts. Too heavy of an oil can raise the oil pressure, and decrease the oil FLOW, possibly starving the engine of lubrication and not taking away enough heat.

Oil is graded by it's viscosity. This is a measurement of how quickly a set amount of oil flows thru a certain size opening at the bottom of a funnel, at a set temperature. (Quick explanation).

When Dino oil is refined, it comes out at a straight weight or viscosity oil. Additives are added to a straight weight oil which make it thicker when at operating temperatures. I read one article where the author described the additives as polymers that look like starfish. When the oil is cold, the "starfish" are curled up and the oil flows quickly. When the oil is at operating temps, the starfish polymers open up and make the oil flow slower. The amount and size of the polymers determine the thickness (viscosity) of the oil when it is hot.

Synthetic oils are different as they change "some" of their viscosity naturally as they go from cold to hot. So less additives are needed to make the multi weight synthetic oil. The bad thing about all of these additives is they wear out after a while. Then your oil loses some of it's

lubricating properties when hot. Not good. This is one reason why Synthetic oils can go longer between oil changes. They have less impurities and need less additives.

My previous 02 Miata called for 5w-30 oil. My current Miata calls for 5w-20 oil. This means the oil flows like a 5 weight oil when cold, but thickens to either a 30 or 20 weight oil when hot. I read one reason why my 06 Miata calls for the lighter 20 weight hot oil is because manufacturing tolerances are so tight these days that a heavier oil will not flow well enough to cool and lubricate properly when the engine is hot. Too heavy (whatever that may be) of an oil is not good.

Most newer cars have the engine computer program set to make the engine rev high on start when cold. This is to quickly heat the catalytic converter and reduce start up exhaust emissions. But this is REALLY hard on the engine as it takes a moment or 2 for oil to start moving. Based on this fact, and what I read chatting with others on “Miata.net”, I am using a 0w-20 synthetic oil. The faster the oil gets to the moving parts on cold start, the better. This “0w” oil when cold flows faster than the “5w” multi-weight oil. When it is hot, it is the proper 20 weight oil. For this same reason I used 0w-30 oil in my previous 02 Miata.

So how often should I change my oil is a question I have been asked. The first thing I say is no matter how many miles you drive your Miata, change the oil at least once a year. If I use “Dino” oils, then I like to change the oil every 3,000 miles. So if I drive only 3,000 miles a year, then Dino oil is plenty good enough and I would change it right before I would store the Miata for the winter. Fresh oil in the engine over the winter gets the acids out and protects the motor.

Since I use my Miata commuting for work, I like to use Synthetic oils. I am using the 0w-20 Mobil 1 Synthetic and I change it every 6,000 miles. The 0w oil on cold start gets the oil to the moving parts quicker. Since the synthetic oil is more pure, I can run it longer. Plus I have read where synthetic oils may lubricate better to give you better fuel economy.

Another factor in engine lubrication is using a good quality oil filter. The 1989 to 2005 engine has the filter mounted horizontally. A good oil filter will have a good anti drain-back valve which holds the oil in the filter between starts. This helps get the oil moving even faster on a cold start. The Mazda and some other brands use a cheap black rubber valve which rarely worked to my satisfaction. I took a liking to the WIX brand, as it has a red silicone valve which works well. You can see the red valve when you look in the holes around the outside of the face of the filter.

I used the WIX # 51365 for my 02, and I now use the WIX # 51348 for my 2006 Miata. These also filter particle size down to 19 microns. This is pretty small!

So,… As I am not the expert, I am NOT suggesting you do anything. I am merely explaining my understanding of oils, and why I chose to use the oils I use. I take no responsibility for decisions you make and how it effects your car. But I hoped I have helped someone understand oils a little better.

Click here if you want to read a lot more.