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# The Oil Report

"Oil the News That's Fit to Print!"

BLACKSTONE LABORATORIES


**Blackstone is getting a new look! Well, our website is, at least. Same great info, same great humor, only fewer problems with the forms and an updated look. Stay tuned for an email alert.**

## Avoiding the Heebie-Jeebies

**by Jim Stark**

We often get oil samples from clients who, for one reason or another, let an oil change lapse beyond the miles intended. There will be a note on the oil slip saying something like, "Oops, I ran the oil too long! Hope the engine is still okay." It invariably is and often, wear hasn't changed enough to indicate the engine even noticed the extra miles. The feeling that the oil was run too long is a perception problem, not an actual one.

Most people have a feeling about oil changes and when they should be performed. It is hard to say where the feeling comes from, but it isn't based on anything real as far as I can tell. When you think about it, for the century or so that cars and trucks have been around, no one has known for sure when the oil needed changing. Your car's manual is the first in line for suggesting how often the oil should be renewed and the type of oil is allowed in the engine. (Sometimes a threat will be included that involves not honoring the warranty if their suggestions are not followed. Such threats are generally hollow, though if an engine fails under warranty you can be sure any failure will be investigated by an inspector, and the inspector's report will be taken as fact by the people who decide if paying the claim is justified. There are companies that do this for a living.)

**Who Decides It?**

The next in line for suggesting oil change intervals are oil companies. They make a living selling oil so they are not likely to suggest any more miles run than suits them, unless they are selling expensive oil, and then the justification may be that you can run these types of oil far longer than others on the market. Both the automakers and the oil companies have their own agendas; the oil change intervals they suggest will generally be conservative.

The next influence is usually how often your dad (or some other strong influence on your young life) changed his oil. I don't know about your dad, but mine said to change the oil every 3,000 miles, regardless. I have no idea where that came from but it may have had some relevance for the engines of his day. They were loosely machined with sloppy tolerances and questionable metallurgy, and perhaps 3,000 miles was stretching things. Engines today do not have the problems of yesterday. They are sealed up tightly, wear very little and only rarely suffer from an actual parts failure. When parts do fail they tend to fail early, not later. If a part fails, it has little or nothing do to with oil change intervals.

When I was driving my first cars I would look at the oil on the dipstick. When it got black enough and thick

enough, the oil got changed. That was a measure of sorts and it worked out okay, though it was several degrees short of being a scientific measure.

Whatever has influenced you over the years about when it is time to change the oil, it is something that is powerful enough to give you the heebee jeebies if you violate it. Here is a little logic that may help cure that uncomfortable feeling.

**Logically Thinking**

Oil doesn't wear out. By its very nature, it will lubricate, clean, and cool the engine (or whatever machine it may service). If you use oil analysis, the oil can provide invaluable information about what is going on inside the engine, including when it needs to be changed. If you change the oil before it needs to be changed, you are wasting time and money. The oil in your engine can be run until the point at which it can't adequately lubricate, clean, or cool the parts. With accurate oil analysis you can see the necessary change point. We call it the oil change sweet spot.

The oil change sweet spot is different for nearly everyone because it is determined by several variables. To mention a few: your engine type, how you drive, the oil sump size, the environment you operate in, the length of your average trip, etc. Way down the list is the type and grade oil you use. Three people driving the same car have three different oil change sweet spots. When you read an oil company's claim that you can run their oil several times longer than competitive products, you are reading balderdash. Even the newer oil change lights provided with many cars today only get it right some of the time. Some of them are actually pretty good though they err seriously by overstating their case early in the engine's life and then consider too few variables later on, as the engine matures.

**Can You Extend?**

When a client states that they are interested in extended oil use, the first thing we consider is the average miles that others are using for oil changes in that type of engine. That is only the starting point. If you are running fewer than average miles and your wear is better than average, we will suggest moving up to average miles. If all looks well at average miles, we will move you on up the line to extended miles. Every time you increase your oil change, we will appraise wear levels and the balance of the metals. You can continue increasing a step at a time until the oil gets too abrasive with metal and contaminants, or too thick, to do its job properly. At that point we are zeroing in on your oil change sweet spot.

We have some engines out there that can't run 2,000 miles without producing excessive wear. We have others that are running more than 10,000 miles on an oil fill and look like they could easily go longer. In my personal vehicle, a Toyota 3.4L V-6, I just finished a 9,750-mile oil change. That will be increased to more than 10,000 miles for the current oil fill. I'm using routine, petroleum-based oil from my local garage. Every time they change the oil they put a sticker up on the windshield requesting I return for another oil change in 3,000 miles. Whether you go back at 3,000 miles or 10,000 miles is really between you and your engine.

Everyone has their own tolerance level for metals. Some see metals reading a few ppm high and get a serious case of the heebie jeebies. And some people can see everything reading high and it doesn't bother them. Regardless of what we say, it's up to you to decide when to change your oil. But we can help you find the tipping point for when (in our opinion) the oil is not good to run any longer. And when you see what that point is, you just may be amazed. Even your 3,000-mile daddy might be amazed.

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## Report of the Month

**Compare these two samples, both from 7.3L Power Stroke engines. Both are running extended oil changes. Why is one wearing more than the other?**

(To learn where the various elements might be coming from, click here.)

**Engine #1**

| Elements in Parts Per Million | | | |
|---|---|---|---|
| | MI/HR ON OIL | 17,223 | UNIVERSAL AVERAGES |
| | MI/HR ON UNIT | 166,872 | |
| | SAMPLE DATE | 3/30/06 | |
| | | | |
| | ALUMINUM | 2 | 2 |
| | CHROMIUM | 2 | 1 |
| | IRON | 21 | 17 |
| | COPPER | 2 | 4 |
| | LEAD | 2 | 4 |
| | TIN | 1 | 1 |
| | MOLYBDENUM | 4 | 23 |
| | NICKEL | 1 | 1 |
| | POTASSIUM | 2 | 1 |
| | BORON | 2 | 4 |
| | SILICON | 4 | 9 |
| | SODIUM | 3 | 4 |
| | CALCIUM | 1388 | 3131 |
| | MAGNESIUM | 10 | 83 |
| | PHOSPHORUS | 1177 | 1117 |
| | ZINC | 1362 | 1293 |
| | BARIUM | 0 | 1 |

**Engine #2**

| Elements in Parts Per Million | | | |
|---|---|---|---|
| | MI/HR ON OIL | 17,637 | UNIVERSAL AVERAGES |
| | MI/HR ON UNIT | 100,388 | |
| | SAMPLE DATE | 5/19/08 | |
| | | | |
| | ALUMINUM | 2 | 2 |
| | CHROMIUM | 2 | 1 |
| | IRON | 31 | 17 |
| | COPPER | 44 | 4 |
| | LEAD | 8 | 4 |
| | TIN | 4 | 4 |
| | MOLYBDENUM | 3 | 23 |
| | NICKEL | 1 | 1 |
| | POTASSIUM | 3 | 1 |
| | BORON | 1 | 4 |
| | SILICON | 15 | 9 |
| | SODIUM | 6 | 4 |
| | CALCIUM | 3003 | 3131 |
| | MAGNESIUM | 12 | 83 |
| | PHOSPHORUS | 1102 | 1117 |
| | ZINC | 1266 | 1293 |
| | BARIUM | 0 | 1 |

| PROPERTIES | | Values | Should Be |
|---|---|---|---|
| | SUS Viscosity @ 210 | 67.8 | 66-78 |
| | cST Viscosity @ 100C | 12.36 | 11.9-15.3 |
| | Flashpoint | 405 | >410 |
| | Fuel % | 0.5 | <2.0 |
| | Antifreeze % | 0.0 | 0.0 |
| | Water % | 0.0 | <0.1 |
| | Insolubles % | **0.2** | <0.6 |

| PROPERTIES | | Values | Should Be |
|---|---|---|---|
| | SUS Viscosity @ 210 | 71.9 | 59-65 |
| | cST Viscosity @ 100C | 13.45 | 9.9-11.9 |
| | Flashpoint | 430 | >375 |
| | Fuel % | <0.5 | <2.0 |
| | Antifreeze % | 0.0 | 0.0 |
| | Water % | 0.0 | <0.1 |
| | Insolubles % | **0.3** | <0.6 |

These two 7.3L engines are both running about 17,000 miles on the oil. Both engines have more than 100K miles on them (in fact, the one wearing better actually as more miles on it than the other), and both are running 15W/40 oil. With everything else being roughly equal, the difference in wear is most likely due to the way they're operated. We are not sure what kind of conditions engine #2 is running in, but chances are good it does more towing, hauling, or stop-and-go driving than engine #1. Because his engine is wearing more, owner #2 should probably be changing his oil more often. Incidentally, engine #1 is running a well-known, petroleum-based 15W/40. Engine #2 is running a high-dollar synthetic 15W/40. We don't think oil type plays much of a part in wear, but we bring this up to illustrate the point that buying expensive oil doesn't necessarily mean you can run your oil longer.

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