

Confused about what we mean when we ask about Make-up oil on the slip? Not to worry, so are a lot of people. We recently changed the wording to be more clear: "Oil Added in Between Oil Changes" and what we want to know is, how many quarts did you add in between the last oil change and this one? Since changes in consumption can tell us about the engine, that's information we like to track.

The \$999,999 Question!

The million-dollar question is, What oil should I use? But a close second is, *How often should I change my oil?*

by Kristin Huff

Change is inevitable, right? But not as inevitable as it used to be, at least for your engine oil. When it comes to the questions we get every day, right up there with "What kind of oil should I use?" is "How often should I change my oil?" Happily, the answer for most people is: Not as often as you used to.

What other people will tell you

Back in the day, everyone knew you changed your oil at 3,000 miles or three months, whichever comes first. Wait, did I say *back in the day*? Lots of places still tell you that's how often to change it, and not surprisingly, the places you're hearing this are oil change places that make money from you coming in regularly. Perhaps you've heard words to the contrary whispered by a friend. (Psst: You don't really need to change at 3,000 miles!) Or perhaps you read your driver's manual in disbelief. 5,000 miles? 10,000 miles? No way! Maybe you've gone online to try and make sense of the question and found instead a whole field of opinions and pundits telling you what to do. We're here to add one more voice to the cacophony, and hopefully you'll believe us because hey, we've got science on our side. The answer to how often you need to change your oil is: It's different for everybody.

Most cars and trucks (motorcycles, boats, etc.) have guidelines listed in the owner's manual that outline certain driving conditions and how often to change the oil based on that. The problem is, sometimes the conditions they outline as "severe" are laughable. We've seen manuals that say if you're doing primarily city driving, that's severe. Call me silly, but I'd say "severe" should count as something that's out of the ordinary for most people. Most people drive to work and back. Most people drive to the store, go to school, take their kids to school, whatever. Severe operation, on the other hand, could legitimately be something like lots of operation on dusty roads, towing constantly, driving really fast in a really hot or really cold place, or driving up and down mountain passes. Under these conditions, we could see needing to change the oil more often. But again, it really is a case-by-case thing. City driving for me, in Fort Wayne, Indiana, is different from city driving in LA. My point is, despite the best intentions of the people who write the guidelines, how often you should change your oil really depends on you, your engine, how you drive, and where you drive. One caveat: As long as your engine is under warranty, you should change however often the manufacturer says to. That way if something goes wrong, they can't blame you for lack of maintenance.

Most new engines also come with an oil life monitor to tell you when to change the oil. This is a good system, and even if it's not 100% accurate all the time, it's better than the 3,000 miles or three months system. Lots of people don't trust their oil life monitors. And different oil life monitors take different things into account. We've been told that certain German automakers changed from basing theirs on variables such as cold starts and RPMs to basically counting down the amount of fuel used. Some have a sensor in the oil that estimates particulates in the oil. Some monitors seem to give better recommendations the longer you use them. All this is fine and it's better than nothing, but there's also oil analysis. Guess which method we like best for determining how often you should change the oil?

What we look at

When you send in a sample, we ask on the oil slip if you're interested in extended oil use. Sometimes people don't know what we

mean, but what we want to know is, do you want to run your oil longer than you currently are? We often find that people are changing their oil too soon. As you know there is not one oil-change interval that's perfect for everyone, so what do we take into account when we do recommend longer oil changes?

Metal

If you've seen our report, you know that we keep a database of all the engines we've ever seen. We average their wear and then compare that to your own sample to see what's reading high, what's normal, and what's better than most. We like it when you send along notes. The more you tell us about how you're driving or any specific conditions that might affect the sample, the better the recommendation we can give you.

If wear is above average, we always look for reasons that might explain why. For example, say your metals are generally higher than average but you're also running your oil longer than average. We take that into account and give you an estimate on how much longer we think you can go for the next oil change. We don't like to take too big of a leap. We wouldn't, for example, tell you to go from 5,000 to 10,000 miles because you might send in a 10,000-mile sample and have lots of wear, and we wouldn't know where the tipping point was. But we might tell you to go 7,500 miles next, and if things look good at that point, to go longer after that.

Some people automatically think having more wear than average is bad, but that's not necessarily so. If there's a good reason for the wear, and if there's not so much metal that it's making the oil itself abrasive, we're happy to let a little extra metal ride. The question is, are you okay with it? In the end our recommendation is just our opinion, and you should do whatever you're comfortable with. Some people want their numbers to look just like averages. Some people see higher wear and are comfortable with it. It's really up to you in the end.

Sometimes we'll see extra metal and decide something else might be going on, and we'll recommend a shorter oil change as a result. Obviously shorter oil changes don't fix a problem if one exists, but they do accomplish two things: one, you're able to monitor the problem more closely, and two, changing the oil more often helps get the extra metal out of the system. Once a lot of wear builds up, the oil itself can become abrasive, which causes even more wear. It's a cycle to avoid.

Contamination

We also look at any contamination that might be present in the oil. Obviously no contamination is the best, but your engine can tolerate small amounts of fuel and (sometimes) moisture without it being a serious problem.

Fuel is actually a very common contaminant. It mainly comes from normal operation and idling, and as long as it's not causing any wear problems, we usually would go ahead and recommend running longer on the oil even with some fuel present. But if fuel persists or the trend is one of increasing fuel with each oil change, we'd probably recommend cutting back on your oil changes for the reasons outlined above.

We don't see water very often because modern engines are closed up tight. But we do see antifreeze, and when it's present we almost always recommend changing the oil more often. Antifreeze destroys the oil's ability to lubricate parts, which is why it starts causing poor wear so soon (usually bearing wear).

We also look at how oxidized the oil is with the insolubles test. Oil oxidation happens normally and for the most part, your oil filter removes the oxidized solids from the system just fine. Occasionally something (excessive heat, contamination) causes the oil to oxidize faster than usual and the oil filter can't keep up. In this case we would also recommend a shorter oil change, at least until you can figure out why it's happening. The insolubles test also helps us determine soot problems for diesel engines. Although we don't currently quantify soot, when there is too much soot present, the lab lets us know that they could not read insolubles in the test tube. We'll usually make a note of that in the comments and factor that into our oil change recommendation. If everything else looks okay, we might suggest trying a longer run, or if there is ring wear and other signs of poor combustion, we would probably tell you to cut back.

Operation

How you drive is another factor we take into account when we suggest your next oil change interval. If you and I both have the exact same Subaru engine except you go to the track regularly and all I do is drive to work and the store, then you might get a different recommendation than me. Or maybe you won't -- if your engine looks good and it's faring well under the racing conditions, we might be running the same oil changes. Or, if someone tells us their commute is a long highway drive every day, that person may be able to go a lot longer on their oil than someone with the same engine who drives two miles each way to work and back every day. It's all in the numbers. The numbers don't lie!

What about the oil?

Notice what we have not said we take into account: the brand you're using and whether it's synthetic or petroleum oil. When Jim started this company back in 1985 he came up with a line he liked to use: Oil is oil. We still stand by that today. The oil guys would have you believe otherwise, but brand really does not seem to make a difference in how your engine wears, or how often you can change your oil. Well, okay, if you were using Joe Bob's Oil that he "recycled" in the back of his filling station from emptied-out oil pans that he filtered with a piece of cheesecloth, we might say in that case brand does matter. But as long as you're using an API-certified oil, your engine probably isn't going to care what you use. We like synthetics and we like conventional oil. In the end, what you use and how often you change your oil is completely your choice. We'll give you our recommendation and you can do whatever you want with it. If you want to run longer on the oil despite having high wear, that's totally fine. And if you have great numbers and you like changing at 3,000 miles, that's perfectly fine too. It's your engine, your money, and your life: change it when you want!

Report of the Month

This Subaru STi has seen better days. Can you tell what's ailing it?

Hint: There are pictures below that show the damage.

To learn more about where the elements are coming from, [click here](#).

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	579	UNIT/ LOCATION AVERAGES	200	2,200	2,223	1,653	UNIVERSAL AVERAGES
	MI/HR on Unit	776		200	22,741	20,541	18,317	
	Sample Date	06/03/13		05/19/13	08/03/12	06/18/12	05/06/12	
	ALUMINUM	5	2	9	2	2	2	4
	CHROME	3	1	3	0	0	0	1
	IRON	12	6	19	4	4	4	9
	COPPER	94	4	6	6	6	3	9
	LEAD	87	295	7	7	10	18	3
	TIN	22	1	11	3	1	0	1
	MO LYBDENUM	25	6	10	1	1	1	72
	NICKEL	1	0	0	0	0	0	0
	PO TASSIUM	4	5	6	5	2	6	2
	BORON	7	7	34	1	1	5	46
	SILICON	71	10	248	7	8	9	11
	SODIUM	386	252	34	394	372	369	28
CALCIUM	2211	2151	2389	2402	2224	2186	2003	
MAGNESIUM	16	9	9	11	10	14	371	
PHOSPHORUS	1261	1124	1146	1256	1283	1205	811	
ZINC	1465	1290	1264	1595	1475	1340	961	
BARIIUM	0	0	0	0	0	0	0	

Values
Should Be*

PROPERTIES	SUS Viscosity @210°F	60.4	59-65	75.3	89.6
	cSt Viscosity @ 100°C	10.33	9.9-11.9	14.34	17.88
	Flashpoint in °F	420	>375	415	420
	Fuel %	<0.5	<2.0	<0.5	<0.5
	Antifreeze %	0.0	0.0	0.0	0.0
	Water %	0.0	0.1	0.0	0.0
	Insolubles %	0.1	0.6	0.2	0.1
	TBN				
	TAN				
	ISO Code				



*THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

This STi mostly sees street use, with a little racing thrown in at times. A little bearing wear started showing up in the May 2013 sample, and soon thereafter the owner noticed a 10 psi loss in oil pressure. He was concerned about bearing damage, and indeed, the June report showed much higher levels of copper, lead, and tin. He split the case and found damage to all the bearings (one worse than the others). He also found a small piece of something that looked abrasive in the oil pickup screen, which turned out to be a small piece of Scotch Brite pad. The damage was due to too-tight main bearing clearances for the RPMs he's running, as well as a dirty build -- contamination in the block while the engine was being built. He's rebuilding the engine himself and hopes to have it running in July.

