The Oil Report

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

What's With the Unit ID?

People are sometimes confused by what we mean when we ask for the "Unit ID" on the oil slip. The Unit ID is a unique name that you come up with to identify the engine your oil came from. Think of it like a social security number for your engine. It's important to try and be consistent with what you use for a Unit ID. If, for example, you own several vehicales with the 7.3L Power Stroke engine in them, you would not want to use "7.3L" as your Unit ID, because we would not know which engine to use. Try and think up something unique to call each engine, then make sure to use that same name each time you sample that engine. (Some of the more interesting IDs we've run across are "Old Whitey," "Knockarado," "El Toro," "Fordzilla," and "Saturnicus.") Of course, if you only own one of a particular type of vehicle, then something like "94 Chevy" will work just fine. If you can't remember

Spotlight on... the Silent Killer

by Jim Stark

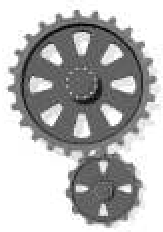
After analyzing engine oil for 20 years, I can safely say the thing that kills more engines than any other is anti-freeze seeping into the oil. We call it the "silent killer" since there is normally no indication this dreadful contaminant is about to strike until after the damage is done. Neither you nor your mechanic can see it in the oil. The dealer won't know it's there. We like to say engines speak before they fail, but in this case, you aren't likely to hear much of anything until you hear just about the worst sound an engine can make. Oil analysis is the only way of knowing this sneaky killer is closing in on you. We can see it in the oil at a trace level, long before any harm is done.

We call people daily to let them know anti-freeze contamination is about to ruin their day. A typical reaction is, "What? That engine is running fine!" And they are right — the engine will, in most instances, run perfectly well until a bearing spins, oil pressure drops, and the engine destructs to the point of no salvation.

Some engine configurations are more susceptible to the problem than others: V-6s and V-8s for instance, are perhaps more prone than other engines. But no engine is immune (except air-cooled engines!). One would think that after 100 years of building engines, the automakers would get it right. To my knowledge no one has, though some do better than others.

The Problem With Design

The engineers who design engines do a marvelous job of building lighter, more efficient and faster engines. But for every step forward in the process, there are compromises. Building lighter engines necessitates working with new alloys for the various parts that are bolted together. Gaskets are used to seal between the parts. To get an engine perfectly right, they have to use parts that expand and contract with heat at the same rate, and gaskets that are hardy what you called an egnine, give us a call and we'll help you figure it out.



enough to seal well even after they age and suffer millions of heat cycles. You can imagine the engineers tossing in their sleep while wrestling with this dilemma.

A classic example of the problem was a Jaguar in-line 6-cylinder engine I once owned. I loved that engine with its long, high-end torque curve and mellow growl. It was probably the first duel overhead cam design that managed quiet chains in the days before belts were used. But for all its wonderful assets, there was this one drawback: they used an aluminum alloy head on a cast iron block. If you managed 50,000 miles on a head gasket you were a very fortunate person.

With an in-line design, the anti-freeze contamination usually develops at the head gasket. With the V-designs, a more common source of the problem is intake manifold gaskets. The manifold gasket supports the air/fuel system mechanism and straddles (and is bolted to) the heads. You can imagine the complexity of the problem of heat cycles. Block expansion forces the heads up and away from the crankshaft. The lowly intake manifold is not in a position to move in concert with the expansion. It would be like trying to ride two horses standing on the two saddles.

The result of this set-up is that intake manifold gaskets fail with great regularity. Anti-freeze starts seeping into the oil. It often takes quite a long while before the problem manifests itself in a failure, but it can also happen quickly. Since there are usually no obvious symptoms of the problem other than a gradual loss of coolant, the unwary engine owner usually drives the engine to oblivion.

Another common question we hear is, "How long until it fails?" Unfortunately, it's impossible to predict how long an engine with an antifreeze problem will last. Many variables factor into the equation: the type of engine, how it's driven, the environment it's operated in, and — the most unpredictable of all — Lady Luck. Some people can limp along for ages with a slight trace of coolant that never turns into anything serious. Others turn up a trace and then WHAM! Faster than you can say "spun bearing" the engine fails.

Don't quote me on this, but if I had to estimate the severity of the problem in car and truck engines today — judging from our oil samples — I would suggest 1–2 % of the cars and trucks in the road today are in the process of failing from anti-freeze contamination of the oil. Fortunately, most antifreeze problems can be detected early with oil analysis, and in most cases we can save the engine before a failure. We would like to save all of them. But we can't save anything until see the oil from it.

Report of the Month

What's going on with this 2.5L Nissan engine? See the caption below for an explanation. Don't look right away -- take a good look at the report first.

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

Elements in Parts Per Million

MI/HR ON OIL	5,405	UNIT/ LOCATION AVERAGES	6,225	1,949	5,138	5,162	UNIVERSAL AVERAGES
MI/HR ON UNIT	54,379		48,974	40,800	35,662	30,500	
SAMPLE DATE	9/27/04		6/15/04	2/23/04	1/18/04	10/21/03	
ALUMINUM	5	4	**4**	6	3	2	3
CHROMIUM	1	1	1	1	1	1	1
IRON	6	9	**13**	**12**	**6**	10	10
COPPER	5	4	6	3	4	6	4
LEAD	4	3	**8**	**2**	**0**	5	3
TIN	0	0	0	1	0	0	0
MOLYBDENUM	368	537	627	588	430	594	69
NICKEL	0	0	0	0	0	0	0
POTASSIUM	1	10	4	5	13	17	5
BORON	5	18	9	14	59	5	49
SILICON	16	16	20	21	12	13	12
SODIUM	17	20	30	25	13	15	7
CALCIUM	2872	3021	3103	3045	2893	3113	2238
MAGNESIUM	7	6	7	6	9	8	193
PHOSPHORUS	1103	1167	1172	1197	990	1160	810
ZINC	1248	1265	1326	1312	1193	1261	974
BARIUM	1	1	1	1	1	1	2

Properties

TEST	cST VISCOSITY @ 40 C	SUS VISCOSITY@ 100 C	cST VISCOSITY@ 100 C	SUS VISCOSITY @ 210 F	FLASHPOINT IN F	FUEL %	ANTI-FREEZE %	WATER %	INSOLUBLES %
VALUES SHOULD BE				59-69	>360	<2.0	0.0	<0.1	0.6
TESTED VALUES WERE				68.7	445	<0.5	0.0	0.0	0.3

Perhaps you thought this was a case of anti-freeze -- but it's not! The owner of this Infiniti uses an oil that contains potassium and sodium as additives. (The minor blip in lead was from a temporary particle streak through the bearings.) Not many oil brands and additives use these elements because they can be easily mistaken for anti-freeze in oil analysis. Some additives and oil brands will also use silicon, copper, or lead as additives. There's nothing wrong with using an oil or additive that contains these elements -- just let us know. And if you're not sure what's in the additive or oil you're using, you can always send in a virgin sample of it and have it tested. We'll let you know if there's anything in it that might influence your analysis and we'll take that information into account when interpreting your data.

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