How Long Can I Extend My Oil Drain?

One of the most common questions after receiving an oil-analysis report is, “How much longer can I run the oil?” Many factors must be considered before answering that question.

The biggest factor when determining remaining oil life is multiple samples from the same application. If viewing only one sample report, there is no reference point for the rate of change or how the oil is trending over time. If we have the baseline or starting point of the oil, we may be able to determine a partial trend, but it’s best to have two to three used samples to have a better idea about how the oil is holding up. Some physical properties of the oil, such as oxidation and base number, do not change on a linear scale, which is why we need several samples. Oxidation can change drastically under certain conditions, including heat exposure. Oil-temperature increases cause more oxidation, which in turn cause elevated viscosity. Similarly, Total Base Number (TBN) can decrease by varying amounts depending on operating conditions and contamination. A trend of these properties is important to establish when considering extended drain intervals.

A secondary data point that affects oil-change intervals is wear. Abnormal or elevated wear metals in your sample report indicate a mechanical issue, and it’s best to avoid extending the drain interval until the problem is addressed. If the source of abnormal wear is not determined, it will age the oil at an accelerated rate, further increase wear and ultimately lead to mechanical failure.

Another variable to consider is the vehicle or equipment service conditions. Normal service primarily includes highway or freeway driving, while severe service includes short trips, excessive idling, dirty/dusty conditions, towing or hauling and fleet use. The best trends for calculating drain intervals are seen when oil samples are taken under the same driving conditions. If one sample is taken during normal service and another under severe service, a rate of change or trend cannot be calculated, and it will be difficult to establish a safe drain interval.

Contaminants		Fluid Properties					
Soot	Water	Viscosity 40°C	Viscosity 100 °C	Acid Number	Base No. D4739	Oxidation	Nitration
%	%	cSt	cSt	mg KOH / g	mg KOH / g	abs / cm	abs / 0.1mm
1.3 - E2412	<.1 - FTIR		14.5		4.98	13	11
0.6 - E2412	<.1 - FTIR		14.0		3.83	12	10
1.9 - E2412	0.3 - Hotplate		14.8		2.93	20	16
3.1 - E2412	<.1 - FTIR		16.3		2.28	24	16
4.8 - D7686	<.1 - FTIR		**22.7**		1.41	**78**	**44**

In the example above, the oil had not been changed for all five samples; only the filter was changed. Each sample had about 20,000 miles on it. A noticeable trend is that oxidation and viscosity begin to increase by sample 4. On sample 5, the viscosity, oxidation and nitration increased substantially. At this point, the oil is nearing the end of its life as the base number is approaching 1. While it hasn’t reached the condemning level of <1, the viscosity, oxidation and nitration rates are trending up rapidly. With continued use, the rate of change will accelerate more, greatly reducing how many more miles can be driven on this oil.

These reports provide clearer answers on the oil’s condition over a certain mileage or time interval. Comparing four to five reports allows you to see the rate of change on each sample and makes it easier to determine the remaining useful life of the oil.

If you have questions or don’t understand what all the data means after considering these factors, you always have the option of contacting Oil Analyzers for assistance. We can help go through reports with you and provide advice based on those reports.