The Oil Report

May 2004

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

Industrial Testing Options

If you've been sending your samples to Blackstone, you're familiar with our standard analysis, which includes a spectral exam, viscosity, flash point, and insolubles test. But did you know we do more than that? The most common "extra" tests we do for our industrial clients are the particle count with ISO Cleanlness code and TAN (total acid number) tests. The particle count test measures the number of

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particles present in an oil sample at various size ranges at the micron level. It's a good test for industrial clients whose machines are sensivite to larger particles and also gives you a good idea on how effective your oil filtration is.

The TAN test measures the acidity of the oil. If an oil is exposed to moisture, it can make it become acidic, and this could cause problems in your

Spotlight on... the Cleanliness of Oil

by Jim Stark

There are several ways to determine the cleanliness of industrial oil. The test we run on all the oil samples we receive is called the Base Sediment and Water (BS&W) Test. Another test is the particle count, and of the two, the particle count is by far the most precise.

In the BS&W test, an oil sample is mixed 50:50 with a petroleum solvent, agitated and heated, and then centrifuged at high speed. Anything in the oil sample that is not petroleum comes out of suspension, including water. The insolubles form a plug at the bottom of the tapered tube that is quantified as a percent by volume. This is a fairly simple test, but it serves the purpose of rating the general cleanliness of an oil sample.

While some of our industrial clients use the BS&W test as the sole determiner of oil cleanliness, many of them have also opted to add the particle count test. It costs a little more to have this test run, but it can precisely rate the cleanliness of an oil sample. Service managers set cleanliness standards, and if the oil fails that standard by just a little, they will replace in-line oil filtration. If the sample is far out of line, the manager will have the oil filtered outside of the machine or replaced altogether.

There are various methods for performing the particle count test. The method we use at Blackstone is called a "pore blockage," versus other types that are "light" or "laser blockage." In the pore blockage test, the oil is forced through a screen with openings of a certain micron size range. The machine measures how much oil went through the screen and from that, determines the particle distribution in the sample. We can then report the amount of particles found in six size ranges, starting with 2 microns,

machines. It also helps to know the TAN of your new oil (they don't all start off at 0.0).

We do other assorted tests, including PCB screening, specific gravity, total halogens, sulfur, and more. If you have a specific need, just let us know.

along with the ISO Cleanliness Code. Other particle count testing methods tend to read water and air bubbles as particles. The pore blockage method, on the other hand, not only ignores water droplets and air bubbles but allows us to rate the cleanliness of water/glycol and emulsified oil/water mixtures.

Many industrial clients today request the particle count test for hydraulic oils. They use it to determine whether an oil fill is in serviceable condition and to rate the effectiveness of in-line oil filtration on machines and systems. If an oil sample fails the cleanliness test, it can usually be filtered to an improved cleanliness rating and then returned to service.

Some types of machines and systems won't function properly on dirty oil. And some maintenance managers just feel better knowing the oil in their machines is in pristine condition. The particle count test can fulfill both needs. If you would like a particle count run on your oil samples, just mark it on the oil information slip.

Report of the Month

What's wrong with this gear lube oil sample? 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.)

MI/HR ON OIL	6	UNIT/ LOCATION AVERAGES	6				UNIVERSAL AVERAGES
MI/HR ON UNIT							
SAMPLE DATE	01/10/03		7/22/02				
ALUMINUM	6	0	1				2
CHROMIUM	34	0	0				0
IRON	2812	3	7				24
COPPER	3	0	0				0
LEAD	0	0	0				0
TIN	0	0	0				0
MOLYBDENUM	0	0	0				0
NICKEL	3	0	0				0
POTASSIUM	2	0	0				0
BORON	1	0	1				1
SILICON	70	34	33				26
SODIUM	5	1	1				2
CALCIUM	9	0	1				3
MAGNESIUM	1	0	0				0
PHOSPHORUS	797	772	746				542
ZINC	9	2	3				4
BARIUM	0	0	0				0

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				105-135	>425	-	-	<0.01	<0.6
	TESTED VALUES WERE				98.3	490	-	-	0.0	1.0

Wear looked okay in the first sample from this gear box. Then, six months later, the metals skyrocketed. Iron read as the dominant metal, so it appears that this gear box has developed a problem at a steel part somewhere in the system. Silicon has increased too, as have insolubles, so it's possible that an abrasive contaminant has gotten into the system and is abrading a steel part. We recommended taking the system down to look for the source of the problem.

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