

Engine Blood Test

Do-it-yourself engine oil analysis can reveal engine deficiencies.

BY TIM BANSE

Testing four-stroke oil for contaminants can yield important information. And just as marine engines have improved over the years, so too has oil analysis. The traditional method is to drain several ounces of oil out of the sump and send it to a lab. Now, a new product called Engine CheckUp (enginecheckup.com) provides almost immediate results with a do-it-yourself kit. Analyzing a single drop of oil reveals the state of an engine's health.

I recently tested a number of engines with known ailments, carefully following the instructions to the letter. Results were as promised — in fact, even better. And it didn't take long. In each case I pulled the dipstick and held the tip two inches above the test medium, allowing a single drop of warm oil to fall onto the square of absorbent paper. More than a drop distorts results. Oil must be warm so particulate matter doesn't settle in the crankcase sump.

The paper absorbs oil and reacts chemically. Depending on ambient

ACCURATE. We tested this kit on engines with known ailments.

temperature and humidity, the process takes anywhere from two to 15 minutes. The fresher the oil, the more quickly it absorbs. Nasty sludge could take up to 45 minutes. On average, I saw results in about three minutes.

Depending on the individual engine's woes, the test squares reacted to dirt and grime, carbon and oxides, water, coolant, diesel fuel and gasoline. What I saw in black and white, and various shades of orange and brown, were splotches more than a little reminiscent of single living cells magnified under a microscope. To decipher the results, I compared the little rings — three of them — with the chart provided.



These pictures are provided for reference. A more comprehensive explanation of results can be found on the website's page titled "How to Interpret Your Test Results." Here's what I found.

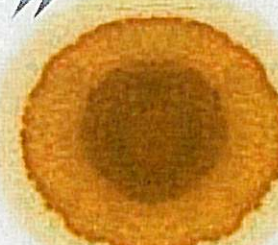
- » A center spot revealed the presence of sediments and carbon caused by a dirty flame arrestor, junk fuel and dirty injectors. On a gas engine, bad spark plugs or wires or even a bad ignition coil could be responsible.
- » A second circle surrounding the center spot revealed the level of oxidation, or the overall health of

Gas Results

The dark core indicates a high degree of sediment/carbon. The second ring's darkness confirms the oil is in poor condition. The jagged outer edge of the second ring indicates a high contamination level. The yellow corona warns that glycol is present (clear would indicate water).



The light core and light second ring mean there is little or no sediment in the oil. The second ring's slightly jagged edge indicates low water content. So, in those respects the oil is in good condition. But, the wide outer ring reveals a high fuel content.



the oil. The older the oil, the more oxidation will have taken place. Overheating increases oxidation by boiling the oil. Other culprits include operating the engine at low oil levels, again stressing the oil.

» The presence of a boundary layer outside the second circle indicated water intrusion — either raw water or a coolant blend of water and antifreeze. Causes could

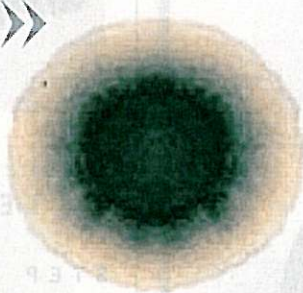
include condensation from running cold (thermostat stuck open) or stop-and-go running. The presence of coolant could mean a cracked cylinder block.

» An outer circle showed fuel contamination. While some is normal, excessive contamination is a problem. Injectors could be dirty and unburned gasoline could mean weak ignition.

According to the manufacturer, engines should be analyzed every 50 to 100 hours. For most boaters that means once in the middle of the season and then again at the end of the season. It's also a good idea to run an analysis after work has been done on an engine to ensure an ailment has, in fact, been cured. A pack with six test patches costs \$30.

Diesel Results

The core and the light first ring indicate little sediment. The boundary layer around the second ring is smooth, which means that water and glycol are not present in significant quantities. The outer ring is moderately wide, however, which means fuel is present.



The core is quite dark, so we can conclude the oil contains an unhealthy level of sediment and/or carbon. The light second ring means the oil itself is in good condition. And no rings beyond eliminates the possibility of glycol or fuel in the oil.



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