

Not all of the diesel fuel injected to the cylinder is expended during the combustion process. Inevitably, some works its way past the piston rings and into the crankcase where it “dilutes” or mixes with the engine's lubricating oil (fuel dilution). The heat in the crankcase will typically evaporate traditional petroleum diesel fuel but biodiesel fuel doesn't evaporate as easily. This creates several issues. Not only does fuel dilution decrease an engine oil's viscosity and lubricity, it can alter the performance of anti-wear additives. Increased wear can lead to premature engine failure if not monitored properly through oil analysis.

By nature, the chemistry of biodiesel fuels can affect the performance of anti-wear additives contained in diesel engine lubricating oils. Zinc dialkyldithiophosphate (ZDDP) is a polar additive that attracts to the metallic surfaces of a diesel engine to form a protective layer against wear. Polar constituents found in biodiesel fuels also attract ZDDP molecules leaving less available to protect engine components and increasing engine wear rates.

Therefore, it's critical to monitor engine oils for excessive fuel dilution when using biodiesel fuels because the resulting wear occurs more rapidly. One manufacturer even requires oil analysis if biodiesel fuel will be used during one of their engine model's warranty period. At a recent SAE meeting in Columbus, IN, Cummins, Inc., announced that it would allow the use of biodiesel up to a B15 blend but, among other stipulations, oil analysis must be done to meet warranty requirements.

**NOTE:** It's extremely important to verify that your oil analysis laboratory is using a test method calibrated for biodiesel or biodiesel blends to avoid the possibility of false negative test results.