POLARIS™ Laboratories

Identify Optimal CJ-4 Drain Intervals

TECHNICAL BULLETIN

There is much speculation about whether or not the new CJ-4 oil formulations will indeed be able to sustain drain intervals for 2007 engines designs using Diesel Particulate Filters. The best way to find out is by regularly testing these new formulations and closely monitoring the effectiveness of both their lower starting base numbers and higher oxidative stability.

CJ-4 oils contain less ash content (detergents/dispersants additives containing magnesium and calcium) and lower amounts of ZDDP (Zinc dialkyldithiophosphate) – an anti-wear additive containing phosphorous and zinc. Excessive amount of ash, sulfur and phosphorus from CI-4 or CI-4+ oil will cause diesel particulate filter pore plugging preventing the DPF from converting NO_x (Nitrous Oxide) to nitrogen and water vapor. It may also cause a loss of power, higher operating temperatures and increased fuel consumption.

But even while a lower ash content will maximize diesel particulate filter performance, it also means a lower starting base number which reduces the oil's ability to neutralize acids making oil testing even more important. It is important to remember that CJ-4 oils are backward compatible with older engines (prior to 2007) while the CI-4 and CI-4+ oils are not forward compatible with the 2007 engines.

Although ultra-low sulfur diesel fuels reduce the production of sulfuric acid, nitric acid production increases as nitrogen reacts with water vapor and heat during exhaust gas recirculation. However, CJ-4s also have higher oxidative stability, meaning that nitric acid formation from the oxidation/nitration process should develop at a slower rate.

To optimize CJ-4 drain intervals, take representative samples at regular intervals and closely monitor any noticeable trends in the oil's total base number and oxidation/nitration results. Be sure to provide the laboratory with the amount of time on both the engine and the oil for the most accurate extended drain recommendations.