Fuel Additive Test - ULSD
Increasing Fuel Economy In Pre-2007 Diesels
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From the time the Environmental Protection Agency proposed that ultra-low sulfur diesel (ULSD) be run in all on-highway diesel vehicles to when it was fully implemented in late 2006, there has been much debate about this new fuel's effect on older diesel engines. Specifically, the fear that ULSD has a lower lubricity and cetane rating, which could affect pre-2007 diesel engines and fuel systems.

One major oil company has assured us that the proper lubrication formulas are now added and mixed before the fuel we use ever makes it to the pump. Still, many aren't convinced this is the case, as a lot of folks in the pickup segment, and especially those in the trucking industry, noticed a decrease in fuel economy once ULSD became our nation's primary diesel fuel.

The Importance Of Cetane

Diesel engines will operate fine on any cetane rating between 40 to 55, but the higher the number, the shorter the ignition delay is, and the more complete and efficient the combustion cycle becomes. In our research we found that cetane numbers in ULSD fluctuate between 40 to 45. And coinciding with what we've seen, with inconsistencies in cetane ratings at the pump, many diesel owners experience fluctuating fuel mileage.

During the refinement of ULSD, fuel is flooded with hydrogen to remove sulfur, but in the process also removes much of the fuel's lubrication properties, as well as cetane content. This leads to many things, but we're focusing on the fact that cetane numbers aren't consistent. This means each time you fill up at your local station, the quality of fuel is different. Knowing this, we contacted FPPF about using its 8+ Cetane Improver.

The Importance Of Lubricity

Another reason ULSD has been blamed for premature fuel system and engine wear is due to its low sulfur content. At 15 ppm (out of 1 million parts, just 15 can be sulfur), ULSD contains only a fraction of the sulfur concentration found in the previously used low-sulfur diesel (LSD), which was roughly 500 ppm. And since sulfur acts as a lubrication agent in diesel fuel, ultra-low sulfur content in ULSD is thought to be one of the main suspects in causing fuel-related problems in pre-2007 diesels, which were designed to run primarily on LSD.

According to Exxon Mobil, ULSD's refining process can reduce the energy content of the fuel. They say a reduction is minimal, but nevertheless, energy loss occurs. Knowing this, we contacted Opti-Lube about its XPD fuel additive, which is designed to increase diesel fuel's lubricity as well as its cetane rating.
Our Test And Its Parameters

Between ULSD's lower cetane rating and lubricating abilities and the fact that diesel prices in Southern California peaked as high as $5.39 a gallon in the summer of 2008, the idea of testing several fuel additives came to us rather easily. After all, everyone at that time wanted some help in the mileage department, so we set out to bring readers a basic, real-world diesel additive test. The experiment kicked off with us running straight diesel fuel for some baseline fuel economy numbers, followed by a lubricity-only additive (Opti-Lube's XPD), and finally, FPPF's 8+ Cetane Improver.

Did Solely Increasing Fuel Lubricity Increase Mileage?

To find out if the above question was true, we decided to run a two-stroke oil pre-mix as an additive in our test vehicle (unconventional at best, and with no cetane improvement). And after 2,000 miles of testing the product, the answer was yes. Our overall mileage increased 1 mpg in combined highway and city driving. Now, is it worth running this as an additive to gain a measly mile per gallon? You be the judge. But for less than $10, we got a 7 percent improvement in fuel economy and enough oil for 10 tanks worth of testing.

Opti-Lube XPD

At the time of our test, Opti-Lube's XPD formula was rumored to be one of the best diesel additives on the market. Along with providing lubricity-enhancing ingredients, XPD also claimed to increase each tank's cetane number by three to five points when mixed properly. In addition, Opti-Lube stated that its product contained injector cleaning agents, could improve not only fuel economy but water separation in fuel, and help cold weather performance as well.

FPPF 8+ Cetane Improver

Another highly regarded fuel additive is FPPF's 8+ Cetane Improver. And by running a 256:1 mixture, it claimed each tank's cetane number could be increased by 8 points. This meant that by filling up with 40 cetane or 45 cetane fuel at the pump we would still be able to make our fuel as energy-dense as possible. Along with increasing cetane rating, FPPF's additive was also capable of reducing smoke and engine noise, and providing quicker start-ups.

Conclusion

Please check out our following results, which should dispel any rumors that all fuel additives are a gimmick, or a myth. At least in our '97 Power Stroke's case, the myth has been proved, rather than busted—the fuel additives we tested did increase fuel economy.
Test Vehicle
Year/Make/Model: 1997 Ford F-350 4x4 Crew Cab
Engine: 7.3L Power Stroke
Transmission: E4OD Automatic
Axle Ratio: 4.10
Tire Size: 285/75R16

Modifications: Upgraded fuel injectors from Full Force Diesel, TS Performance six-position chip with daily driver setting from Bean's Diesel Performance, free-flowing K&N air intake and MBRP 4-inch exhaust, and upgraded transmission from North American Diesel Performance

Test Variables

• Each additive was mixed at the manufacturers' recommended ratio and poured in the empty tank first, before filling up with fuel. (Opti-Lube XPD = 256:1, FPPF = 256:1, the two-stroke, which had no recommendation, was run in a 200:1 mixture).

• The same three filling stations were used throughout testing, and the truck was topped off at the same level each time.

• Real-world driving scenarios: stop-and-go city traffic, interstate commuting (65 to 70 mph, cruise control), and minimal off-road use. Note: Hauling and towing instances were purposely excluded from the test results.

• Eleven thousand miles were driven during testing: first with no product, then with two-stroke oil, Opti-Lube, and FPPF.

• Weather did not play as big a role as one might think. With one of the mildest climates in the country, Southern California allowed us to conduct the test in a virtually uncorrupted manner (no freezing temperatures or extreme heat conditions were faced).

• Heat and air conditioning were rarely needed (no unnecessary drag was placed on the engine).

• Regular maintenance was performed on the truck. And because we were dealing with HEUI, we made sure our oil was changed every 4,000 miles for the cleanest oil possible actuating our injectors (we ran Shell's Rotella T Heavy-Duty 15W-40 engine oil). We also inspected and then replaced the fuel filter before switching to the next additive (no fueling or performance modifications were made to the truck once the testing began).

NO ADDITIVE
Highway Average 14.6 mpg
City Average 13.7 mpg
Overall Average 14.1 mpg
TWO-STROKE PRE-MIX
Best Highway (one tank) 16.3 mpg
Best City (one tank) 14.9 mpg
Highway Average 15.6 mpg
City Average 14.6 mpg

OPTI-LUBE XPD
Best Highway (one tank) 17.4 mpg
Best City (one tank) 15.7 mpg
Highway Average 16.1 mpg
City Average 14.4 mpg

FPPF 8+ CETANE IMPROVER
Best Highway (one tank) 17.3 mpg
Best City (one tank) 15.0 mpg
Highway Average 16.1 mpg
City Average 14.9 mpg

Read more:
http://www.dieselpowermag.com/tech/ford/0911dp_fuel_additive_test/viewall.html#ixzz29O4G7FMR

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