Direct Injected Engines from Some Automakers are Seeing Reduced Performance

Shane McGlaun (Blog) - June 21, 2011 6:02 PM

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Dyno sheet for Constantine Boyadjiev's Audi RS 4 (Source: AutoObserver)

Reduced performance is blamed on carbon deposits

The promise of direct injection is very appealing to drivers and to the automakers that are always looking for an edge in performance and fuel economy. While most people that have vehicles that use direct injection have cited no issues, there are some that are having lots of problems with the technology.

Auto Observer reports that the issue is the tendency of direct injected or DI engines to build up a layer of carbon or soot around the intake valves that can over time significantly affect the performance and economy of the engines. The soot is able to build up in a DI engine because unlike a port injected engine there is no constant spray of fuel that can keep the deposits washed away.

Some engines are more trouble plagued thanks to the direct injection than others. The technology is used in multiple vehicles from different automotive firms including Audi, VW, BMW, Ford and others.

Volkswagen filed a patent application in 2002 that described the issue with DI engines, "Gasoline engines with direct injection of the fuel into the combustion chamber…suffer especially from the problem of the formation of carbon deposits…especially in the neck region of the intake valves." The application also noted that these carbon build-ups "have extremely negative effects" on the performance of the engine.

The patent app was intended to propose a new catalytic surface to the engine that would prevent the buildup of carbon. One automotive enthusiast found out the hard way how much carbon build-up can affect performance. Constantine Boyadjiev purchased a slightly used 2008 Audi RS 4 and later found that carbon build-up is a big issue with the vehicles.

Boyadijev said, "The loss of performance became very noticeable over time." Boyadijev took his RS 4 to a dyno to help document the problem. He reports that when the RS 4 has 15,000 miles on the clock it produced 324 all-wheel horsepower. At 20,000 miles, the same dyno showed 317 AWHP, and at another 5,000 miles, the car produced 305 AWHP.

That is hardly a direct conclusion that carbon build up is the cause of the shrinking power numbers. Anyone familiar with a dynamometer knows that there are a number of things that can affect how much power is read on a dyno including the gear the car is tested in, the heat and humidity on the day of testing, the fuel grade and quality, and even how snugly the car is strapped to the dyno rollers. There is also going to be a normal variance on each run of the dyno.

Boyadjiev said that he paid $1,200 to have the engine cleaned of carbon deposits and when the car went back to the same dyno it put down an extra 41 AWHP. Different engine designs are also having less of an issue with carbon build up so some of the issue lies with the engineers that design the motors.

Some owners of the Cadillac CTS with a direct injected 3.6-liter V6 have also complained of problems with carbon deposits. However, GM is quick to combat these claims. "We maintain great engine function and performance in our all our DI engines through an optimization strategy with our valve events," said Ameer Haider, GM's assistant chief engineer for V6 engines. "Our intake-cam timing, injector targeting and timing of the injection events are optimized to avoid direct fuel contact on the intake valves. This strategy keeps smoke and soot formation to an absolute minimum, which in turn prevents excessive deposit formation."

Direct injection is used in all classes of vehicles today ranging from lowly subcompacts like the Hyundai Accent to compact sedans like the Ford Focus to midsize sedans like the Hyundai Sonata to full size pickups like the Ford F-150 with EcoBoost. Only time will tell if these vastly different vehicles using direct injection will develop issues with carbon buildup down the road.