

A New Diesel Piston That Increases Power And Reduces Emissions



It's no secret that optimizing the internal combustion process is a requirement to improve fuel efficiency, reduce emissions, and increase power in your truck. But what is the best way to accomplish that? Can a simple diesel piston increase power *and* reduce emissions?

According to **Speed of Air (SoA) Engine Technologies** they have developed a patented technology that is supposed to enhance the efficiency of medium-duty

Cummins, Power Stroke, and Duramax engines. In doing so, the pistons will also provide measurable performance benefits.

I am told that SoA's patented piston treatment found on its Hyperformance pistons will provide increased torque and horsepower, reduce emissions, and greatly improve fuel efficiency. These improvements also contribute significantly to extending engine life and reducing service intervals. The fuel savings alone, documented by independent commercial users, are as much as 25 percent and more, a critical aspect for fleets facing higher fuel prices.



Coatings and thermal barriers play an integral part in the piston design.

The SoA patented technology primarily consists of precise, CNC-machined indentations on the piston top, called turbulators, but most often described simply as dimples. If this looks like a golf ball surface, there is a reason for that. A golf ball's dimples create a boundary layer of air that reduces the drag by creating turbulence at the surface of the ball.

The dimpled surface of the SoA pistons is designed to create a similar effect. According to SoA, these turbulators create a thinner, well-attached boundary layer between the air/fuel mixture, the flame front, and the combustion chamber walls. This thin, turbulent layer allows the combustion to burn much closer to the cool metal walls of the combustion chamber, thereby increasing overall combustion efficiency.



We all know how stringent California lawmakers can be, so what are the chances of these ever being CARB approved? According to Chris Parkhurst, CEO of SoA, “We have a test plan in place and two test engines built for SEMA certification (2011 through 2016 Duramax LML to start). After working with the SEMA emissions compliance folks, we determined that the most effective way forward was to get the SEMA cert. first (EPA certified) and then apply for the CARB EO. We hope to have an EO issued by the end of the year.”

Since coatings are also known to improve combustion efficiency, SOA's Hyperformance diesel piston kits also include the application of aerospace-proven thermal barriers and anti-friction coatings on the piston crowns and skirts. The thermal barrier coating helps retain heat during combustion, providing additional efficiency and power. The anti-friction coating minimizes abrasion and resistance for even more efficiency.

Lab tests and real-world operational field testing has been done in a wide variety of applications to confirm the results. We were told that DFC Diesel, Canada's largest diesel engine remanufacturer has been independently testing SoA technology for nearly two years. The testing was done in more than a dozen Dodge, Ford, and Chevy trucks. DFC's testing has been so successful that this company is now offering an entire line of Speed of Air remanufactured engines.



During testing, DFC Diesel observed fuel consumption reductions of 25 percent with factory tuning, an average of 5-percent increases in torque and horsepower, NOx reductions saw reductions as high as 80 percent, and the ability to extend oil change intervals jumped by 50 percent due to decreased soot and fuel dilution.

Other testing was completed in conjunction with Olsen Ecologic Lab in Fullerton, California to compare a stock Cummins 5.9-liter engine to one with a set of Speed of Air pistons installed. In that report, there was a 15.5-percent increase in horsepower and a 15.2-percent increase in torque. Testing also revealed Brake-Specific Fuel Consumption was reduced by 3.2 percent, particulate matter in the exhaust was reduced by 77.6 percent and NOx levels saw a reduction of 61 percent.

“I will point out that we are very much approaching this as a well-understood value proposition to the end user,” says Parkhurst. “We are in the business of solving specific problems for each industry we enter, be it fuel consumption, emissions compliance, reliability/longevity, performance, or some combination of those. As such, we strive to demonstrate a very specific and realistic ROI for each kit we sell. In short, we believe we are the only pistons in the world that will pay you back.”



Parkhurst also told us that SoA is currently in operational testing of heavy-duty trucking applications and has numerous 11- through 18-liter engines (CAT, Detroit, Cummins) on the road or in the build process. These pistons would be the next offering later this year. In addition, SoA's intent is to gain a CARB EO for Tier IV upgrade kits that would allow currently banned engines back into California. The kit will likely include a complete

in-frame rebuild kit, a new SoA turbo, a new tune, and a reasonably light substrate (no DPF/SCR). “The Tier IV kit will take some time to get approved because of likely durability requirements from CARB, but we are confident we will get there,” affirms Parkhurst.

To manufacture these custom diesel piston kits, SoA has licensed **United Engine and Machine Co.** (UEM), a leading manufacturer of pistons with over 100 years of experience and a well-earned reputation for quality.