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ONLINE EDITION
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DECEMBER 2014



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19 Sill-TerHar Collision Center retools for structural aluminum repair

Pulstar presents a new generation of fuel ignition products

by Steve Sharp

Albuquerque, N.M.—When is a spark plug more than just a spark plug? Pulstar plugs are able to ignite a much higher percentage of the fuel by releasing stored energy from an internal capacitor at the same time as the spark jumps from the electrode to the ground strap.

“The burst of stored energy is so intense it forms an energy-dense plasma field chemically altering the fuel mixture,” Enerpulse Technologies Inc. President and CTO Lou Camilli said.

He explained plasma is created by heating a gas or subjecting it to a strong electromagnetic field as in the case of the Pulstar. Changing the fuel’s state from gas to plasma makes it easier to ignite and creates more energy.

“You hear the word plasma all the time —



Indy 500 Winner Al Unser Jr. was amazed at the difference Pulstar spark plugs made in his Suburban. “I could feel the difference. The Pulstar plugs provide better throttle response, drivability, and improved mileage,” he says.

plasma TV, blood plasma. Plasma is one of the four states of matter: solid, liquid, gas, and plasma,” Enerpulse Marketing Director

Heather Tausch said. “Think of plasma-field being similar to an electrical field, by charging the gasses with high energy we’re changing the state from gas to plasma. Because of the increased energy in plasma it increases the volatility of the particular fuel we’re igniting.”

“We’ve all seen developments in spark plugs over the years,” Indy 500 Winner Al Unser Jr. said.

“When approached by Enerpulse, I was skeptical — so many times it’s hard to tell a break-through from gimmick. I wanted to see for myself — and boy was I surprised.

When they put a set in my Suburban I immediately noticed the difference: better

Continued on page 6

2014 SEMA Award spotlights show’s hottest vehicle models

Las Vegas—This year’s SEMA Award for the top-trending vehicle models in four categories were announced on the opening day of the 2014 SEMA Show. The Ford Mustang was named Hottest Car, the Honda Fit took the Hottest Sport Compact honors, the Chevrolet Silverado won Hottest Truck and the Jeep Wrangler received the Hottest 4x4-SUV award.

“The SEMA Show has always been the annual event where the newest and most innovative products are seen first,” said Chris Kersting, SEMA president and CEO. “The SEMA Award celebrates the industry’s unique ability to identify and set the trends that influence consumers worldwide.”

The SEMA Award recognizes vehicle models that specialty-equipment manufacturers believe are the best platforms for accessorization and that showcase the year’s coolest products. It also underscores the cooperative relationship between the



The 2014 SEMA Award winners were announced. Accepting the award, from l., are Alan Batey, president GM North America, global Chevrolet brand chief for the '14/'15 Chevrolet Silverado; Jeff Conrad, senior vice president and general manager of the Honda Division for the '15 Honda Fit; Pietro Gorlier, president and CEO-MOPAR brand service, parts and customer care, Chrysler Group for the '14/'15 Jeep Wrangler; and Dave Pericak, Mustang chief engineer for the '15 Ford Mustang.

automakers and SEMA-member companies.

“Now in its fourth year, the SEMA Award helps guide consumers toward the hottest-trending and most accessory friendly vehicles on the market,” Kersting added.

“Our show exhibitors are industry visionaries who determine the winners of the SEMA Award. The booth space is a ballot, and the vehicles they choose to showcase in their booths are a vote. The most prominent models in each category are the winners.”

The 2014 SEMA Show features more than 2,400 exhibiting companies that manufacture thousands of products designed to improve performance, safety and convenience, as well as those that enhance appearance and comfort. While products are available for every make and model, exhibitors are investing more in the Ford Mustang, Honda Fit, Chevrolet Silverado and Jeep Wrangler than

any other vehicles. Consumers, therefore, can expect to find great specialty products for accessorizing these vehicles.

To learn more about the SEMA Award winners and the products that are available for them, visit www.sema.org/semaaward. ■

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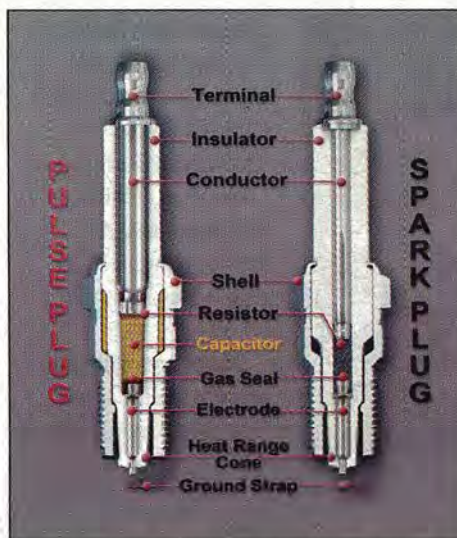
February

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acceleration, better mileage, better drivability, and because of the better burn they improve fuel economy and emissions as well.”

When Unser’s Suburban was tested on the dyno the change in performance was confirmed. On back-to-back runs using stock plugs, then Pulstar plugs, Unser Jr. reports the findings included: minimum torque with the stock plugs was 229 ft.-lbs. and with the Pulstar it was 244 ft.-lbs.; maximum numbers were similarly improved — 255 ft.-lbs. with the stock plugs and 260 ft.-lbs. with Pulstar. There were also gains across the RPM range with the horsepower numbers. Minimums were 153 with stock plugs and 165 with Pulstar. Maximum numbers also improved from 249 to 255. On average, the Pulstar added five ft.-lbs. of torque and five horsepower. “It’s not a big difference, Unser Jr. said, “but because it’s across the entire RPM range it’s noticeable from the driver’s seat.”

“Enerpulse has done exhaustive testing — both real world dyno tests — as well as extensive testing by AVL, the world’s largest independent company for development, simulation and testing technology of powertrain components for OEMs,” Tausch said. AVL works directly with the OEMs and suppliers providing third-party testing



This is a cut-a-way comparison of a Pulstar and a standard spark plug. Notice the capacitor within the Pulstar. The Pulstar stores energy within the capacitor and releases it at the same time as the spark occurs dumping five megawatts of power into the combustion chamber compared to five watts of a normal plug.

and verification of the latest advancements in hybrid, internal combustion engines, transmissions, electric drives, batteries, and software management for passenger cars, trucks and large engines.

“With the exception of the lack of a fine wire electrode found on most modern plugs, the Pulstar appears to be a regular spark plug,” she said.

Unser Jr. added, “Don’t let appearances fool you - this is not the spark plug you’ve held in your hands over the years. This is something entirely different.”

Camilli said the pulsed energy plug and a typical spark plug are identical except for

the capacitor within Pulstar. To create an internal capacitor, the insulator in the Pulstar is much thinner and serves as the dielectric for the opposing plates of the capacitor. The insulator is also constructed with higher aluminum oxide content providing a higher dielectric constant for the capacitor, providing improved energy transfer efficiency.

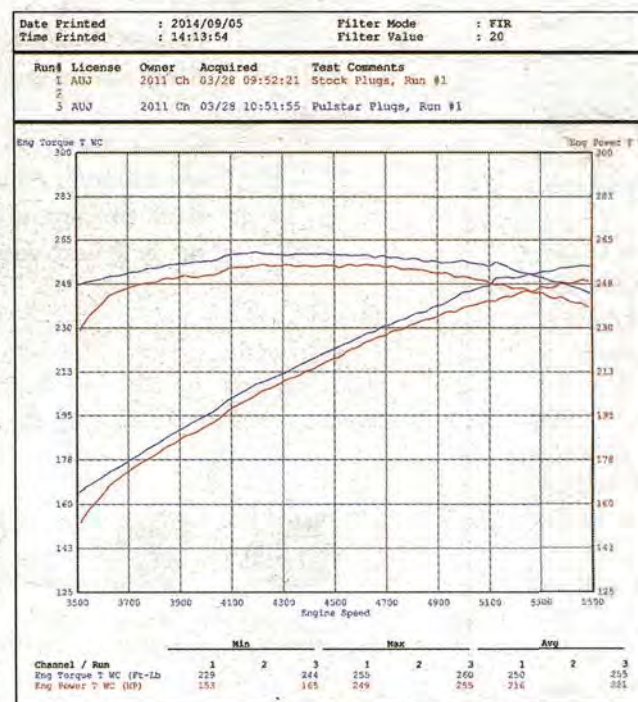
“The cycle that leads up to the spark plug’s flash point is measured in nanoseconds,” Camilli said in a report to the SAE done in conjunction with Texas A&M University and AVL. “The internal peaking capacitor is charged during the rise time of the coil or ionization period of the total spark event. The stored energy is then delivered to the mixture during the ignition event.”

“It is fairly easy to understand,” Unser Jr. said. “Before a plug can flash, it has to build energy coming from the coil. The energy is stored in the capacitor and released at the same time as the spark. The release of the extra energy changes the fuel from a gas state to plasma making it highly volatile. When the plug sparks it now ignites a highly charged plasma field — creating a bigger bang. It’s something every plug variation has been trying to achieve for years.”

An area of focus in the SAE report discussed how the Pulstar addressed cold start emissions when the engine timing is highly retarded to enhance catalyst warm up, Camilli said, “More and more manufacturers are using lean mixtures and highly retarded ignition timing to improve emissions. Having a spark plug that provides an efficient burn during these environments enhances greatly emissions efficiency.”

The same is true for alternative and low-energy fuels - the better they ignite the more power it can produce and the better the emissions, he added.

“Specifically, peak power of the pulsed energy plug is on the order of five mega watts (five million watts) while peak power of the conventional plug is on the order 50 watts,” he said. “Given the pulsed energy plug’s capability to improve ignition and flame development of a fuel-air mixture they also work very well in alternative fuel vehicles including CNG, LPG, and E85 as well as two cycle, power sport, and motorcycle applications. ■



Here is the actual dyno sheet from Al Unser Jr.’s Suburban. Stock plugs are shown in red and Pulstar in blue. The sums for torque and horsepower at the bottom show the stock plugs as No. 1 and the Pulstar as three.

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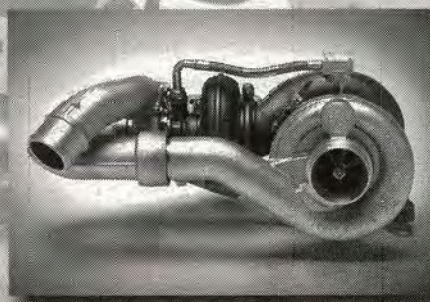
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