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New 2013 SRT Viper V-10 Engine Offers More Power, More Torque, Less Weight

- 640-horsepower all-aluminum 8.4-liter V-10 engine contributes to best power-to-weight ratio of any Viper ever
- 600 lb.-ft. of torque is highest rating of any naturally aspirated automotive engine in the world
- All-new intake system, pistons, exhaust valves, camshaft profile and lightweight aluminum flywheel cuts mass and reduces rotating inertia
- New intake system significantly improves air distribution across all 10 cylinders, contributing to 206-mph top speed
- Proven Tremec TR6060 six-speed manual transmission features an entirely new gear set
- Revised, close-ratio gearing and new final-drive ratio delivers improved acceleration, quicker, smoother shifts
- New powertrain mounting system uses two hydromounts for the engine and one for the transmission

November 20, 2012, Auburn Hills, Mich. -

The heart and soul of the 2013 SRT Viper is exemplified by its handcrafted, all-aluminum 8.4-liter V-10 engine.

Continuing an historic evolution that has spawned milestones such as the industry's first single-cam, variable-valve timing (VVT) system, the latest version of the Viper's iconic engine features an array of improvements that boost performance and efficiency. The upgrades include an ultra-high-flow composite intake manifold for improved air distribution; forged pistons; lightweight, sodium-filled exhaust valves and an aluminum flywheel.

New exhaust catalysts also reduce backpressure, contributing to the SRT Viper's 640-horsepower rating, an increase of 40 horsepower over the previous Viper.

The gain comes with the added benefit of a 25-pound weight-reduction for the fully dressed engine.

Coupled with the more powerful engine is a Tremec TR6060 six-speed transmission that has been refined with closer gear ratios. The car's shifter features shorter throws to engage the driver as well as the gears, while forcefully transferring power to the pavement.

Additionally, the final-drive ratio has been shortened to 3.55 from 3.07, giving the 2013 SRT Viper dynamic, effortless acceleration at all speeds.

The driveline is so robust, it easily manages the V-10's 600 lb.-ft. of peak torque, the highest rating of any naturally aspirated automotive engine in the world. Maximum engine speed (redline) is 6,200 rpm with fuel cutoff at 6,400 rpm.

More power, an emphasis on even torque delivery throughout the operating range and attention to detail at all levels, combine to make the latest generation of the SRT Viper V-10 engine an outstanding successor to the nameplate's legendary lineage.

Block and reciprocating assembly

Constructed of precision cast aluminum, the 90-degree, deep-skirt block features high-strength T356 aluminum, cast-iron bore liners and strengthened bulkheads that ensure block rigidity under high rpm. Upgraded water jackets deliver

consistent operating temperatures across the engine.

Cylinder bore is 103 mm and the stroke is 100.6 mm.

The forged-steel crankshaft is supported by six main journals with cross-bolted, four-bolt, main bearing caps –two vertical and two horizontal for increased structural integrity. Forged, powder-metal connecting rods measuring 158.6 mm are included for superior strength.

The revamped V-10 engine uses forged-aluminum pistons. In addition to delivering greater strength, the new pistons are each 10 grams lighter than those they replaced, trimming mass in the reciprocating assembly. Reduced-diameter, full-floating, 24-mm piston pins also are new.

The pistons also are designed to reduce friction. New steel piston rings measuring 1.5 mm on top and 1.2 mm beneath also mitigate friction. The engine's compression ratio is 10.2:1.

Contributing to reduced rotating inertia in the powertrain is a new aluminum flywheel that affords an 11-pound weight reduction and features a steel outer-ring gear and friction-wear surface for durability. The flywheel, when combined with a twin-plate 240-mm twin-disc clutch, reduces overall rotating inertia by 20 percent, trimming roughly 1/10th of a second from 0-to-60 acceleration and cutting lap times on a typical road course by approximately .5 seconds.

For improved cooling, particularly at the rear cylinders, the head gaskets have been redesigned through the use of computer simulations, validation and extensive testing to accommodate operating temperatures that are balanced across all cylinders.

With optimized coolant flow, even cylinder-to-cylinder temperature-distribution manifests itself in improved performance.

Oiling system

The SRT Viper's 8.4-liter V-10 engine is fitted with a cast-aluminum oil pan designed to provide superior oil-management characteristics in the most demanding driving situations. The pan's design features special baffles, channels and scrapers to funnel engine oil back into the sump. Additionally, the pan is designed and constructed to serve as a structural component for improved powertrain bending.

The engine also includes an exclusive, race-proven swinging-arm oil pickup that moves relative to g-forces encountered in tight turning, aggressive acceleration and hard braking. The swinging pickup moves within the oil pan to ensure the maximum amount of oil is available to the engine by moving side-to-side with the oil in the pan.

A single gerotor oil pump provides pressure for the oiling system and is directly driven off the crankshaft. The engine oil cooler is standard.

Oil change intervals are recommended at 6,000 miles. New Pennzoil Ultra 0W-40 synthetic motor oil is the exclusive lubricant recommended by SRT engineers for its ultra-low friction properties that contribute to the V-10's higher performance. Crankcase capacity with filter change is 10.5 quarts. A special SRT-designed oil filter is used with the V-10 engine.

Intake assembly and cylinder heads

The intake assembly of the 8.4-liter Viper V-10 engine is entirely new with the adaptation of a composite intake manifold that provides better fuel/air distribution and delivers excellent thermal benefits at reduced weight.

The new intake system features runners that are approximately one inch longer than the previous design, while the move to a composite construction from aluminum has significantly reduced air-charge temperatures.

Pushrods are 10 percent stiffer with wall thickness increased from 1.5 mm to 2.0 mm.

Thermal heat transfer, particularly during short hot-soak conditions, is reduced. The composite intake manifold has better insulating characteristics to ensure a cool intake charge for improved response and power.

For 2013, new software dramatically improves throttle response and control.

Like the block, cylinder heads are constructed of high-strength, T356 aluminum for superior integrity. The combustion chambers have been machined via computer numerical control (CNC) for optimized flow and charge motion. Structural changes in the cylinder heads have been incorporated for additional strength and durability.

Combustion chambers are 72 cc in volume. Intake and exhaust valves are both angled at 12 degrees. Lightweight, hollow-stem, intake valves measuring 52.8 mm provide ample intake charging. Exhaust valves are sodium-filled and measure 40.8 mm. The use of lightweight valves helps reduce mass from the valve train. Sodium is added to the exhaust-valve stem for better heat transfer and helps prevent hot spots in the valve head and combustion chamber – conditions that can lead to engine knock.

Valves are actuated by a single-assembled camshaft in the engine block. The Viper engine uses a unique roller-type cam-in-cam design that enables independent exhaust phasing relative to the intake.

The intake profile has been revised to provide more usable torque at the higher rpm ranges of the engine.

The V-10 is equipped with variable-valve independent timing on the exhaust side.

Ignition is through 10 coil packs mated to dual-platinum spark plugs. Spark plugs have been designed for a 100,000-mile change interval.

Exhaust

Stainless steel tube-in-shell exhaust headers have been designed to provide very low restriction and a minimal amount of backpressure. Revised tuning of the exhaust delivers a more distinct character at part-throttle and a more authoritative tone at a higher rpm, with noticeably quieter sound at a mid-range rpm.

For 2013, a revised catalyst wash-coat system helps to reduce backpressure by nearly 20 percent.

Tremec TR6060 six-speed transmission

The proven Tremec TR6060 six-speed manual transmission features an entirely new gear set for 2013 to provide optimal power transfer from the engine to the rear wheels. The new close-ratio gearing is distinguished by a smaller drop between gearshifts, smoother gear synchronization and overall shift feel.

Drivers will feel a notable improvement in shifting quality with shift throws that are nearly 12.5 percent shorter due to a revised shifter-to-transmission connection. The leather-wrapped shifter assembly is connected directly into the transmission to eliminate complicated levers and pivots that interfere with communication with the driver. The result is a direct-mount shift system that provides a solid and precise shift feel.

The SRT Viper will be equipped with a final-drive ratio of 3.55 to complement the closer ratios that improve acceleration and responsiveness.

Powertrain mounting

New for 2013, the Viper will include a new powertrain mounting system that uses two hydromounts for the engine and one for the transmission.

Designed with a highly elasticized rubber and filled with a hydraulic fluid, the hydromounts offer superior damping characteristics for grip, drive comfort, and acoustic performance. Additionally, the hydromounts contribute to overall smoothness of the engine, particularly at idle.

Like many other details on the 2013 SRT Viper, the motor mounts contribute greatly to the Viper's new-found manners and are another example of how SRT engineers managed to hone the character and broaden the appeal of the sports car without sacrificing its attitude.

Power management

For 2013, all SRT Viper models will be equipped with traction control. And to help maximize straight-line performance, they will feature launch control as standard equipment.

Also making its debut on Viper is an advanced electronic multistage stability control system. This feature will dramatically broaden the Viper's performance envelope for drivers of all skill levels.

About SRT

The Chrysler Group's Street and Racing Technology (SRT) brand uses a successful product development formula featuring five proven hallmarks: awe-inspiring powertrains; outstanding ride, handling and capability; benchmark braking; aggressive and functional exteriors and race-inspired and high-performance interiors to remain true to its performance roots.

The 2013 SRT vehicle lineup features five products that are world-class, high-performance contenders that are built with superior craftsmanship and bring the latest in safety technologies and creature comforts. These products include the Chrysler 300 SRT8, Dodge Challenger SRT8 392, Dodge Charger SRT8, Jeep Grand Cherokee SRT8, along with the SRT Viper and SRT Viper GTS which are making their highly anticipated return to the high-performance sports car market in late 2012.

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