2013 SRT Viper Powertrain
OVERVIEW

Chrysler Canada: New 2013 SRT® Viper V10 Engine Offers More Power, More Torque, Less Weight

- 640 horsepower from 8.4-litre V10 helps provide a Viper-best power-to-weight ratio
- 600 lb.-ft. of torque is highest rating for a naturally aspirated automotive engine in the world
- With an all-new intake system, new pistons, exhaust valves, camshaft profile boasts lower mass and reduced rotating inertia
- New intake system significantly improves air distribution across all 10 cylinders
- New lightweight, aluminum flywheel for Viper powertrain for reduced rotating inertia
- Revised, close-ratio transmission gearing and new final-drive ratio improves acceleration, provides quicker, smoother shifts with top-speed performance achieved in 6th gear

At the heart and soul of the 2013 SRT® Viper is a hand-assembled 8.4-litre all-aluminum, V10 engine.

The iconic V10 has been continuously upgraded over the years with improvements in oiling, airflow and an industry-first, single-cam variable-valve timing system. For 2013, the engine features a new ultra-high-flow, composite intake manifold for improved air distribution, new forged pistons, new lightweight, sodium-cooled exhaust valves and an aluminum flywheel. The engine also includes new exhaust catalysts to reduce backpressure. The result is a significant improvement of 40 lb.-ft. of torque and 40 horsepower with weight savings of more than 11 kilograms (25 pounds) for the fully dressed engine.

Coupled to the more powerful engine is a Tremec TR6060 six-speed transmission that has been refined with tighter gear ratios and a shifter with reduced throws to maximize driver involvement, while effectively transferring power to the pavement. Additionally, the final -drive ratio has been shortened to 3.55 from 3.07 giving the 2013 SRT Viper even more voracious and effortless acceleration at all speeds.

For 2013, all Viper models will feature traction control. To help maximize traction for straight-line performance, all Viper models also will include launch control as standard equipment.

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

Preliminary performance ratings for the SRT-engineered V10 include horsepower increased to 640 and torque increased to 600 lb.-ft., making it the highest torque 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 V10 an outstanding successor to the Viper's lineage.

Block and reciprocating assembly

Constructed of precision cast aluminum, the 90-degree, deep skirt block includes use of high-strength T356 aluminum and includes cast-iron bore liners, strengthened bulkheads that ensure block rigidity under high rpm operating condition and improved water jackets for consistent temperatures across the engine.

Bore and stroke of the cylinders is 103 mm by 100.6 mm (respectively).

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 strength. Forged, powder -metal connecting rods measuring 158.6 mm are included for superior strength.

The new V10 includes the use of forged-aluminum pistons. In addition to higher strength, the new pistons are 10 grams lighter than the previous design to help reduce mass in the reciprocating assembly. Reduced diameter, full-floating, 24 mm piston pins also are new.

In addition to forging, the pistons have been developed for reduced friction. New steel piston rings also reduce friction with a 1.5 mm top and a 1.2 mm second ring width.

Compression ratio of the engine is 10.2:1.

One of the biggest contributors to the reduced rotating inertia in the powertrain is the aluminum flywheel. The new aluminum flywheel has reduced weight by 4.9 kilograms (11 pounds). The flywheel includes 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 per cent, translating in roughly 1/10th of a second reduction in 0-to-100 kilometres per hour acceleration and improved performance in 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 provide more balanced cooling across all cylinders.

With optimized coolant flow, a more balanced cylinder-to-cylinder temperature distribution allows for improved performance.

Oiling system

The 8.4-litre V10 is fitted with a cast-aluminum oil pan that is designed to provide superior oil management characteristics in the most demanding driving situations. The design of the pan is fitted with special baffles, channels and scrapers to funnel engine oil back into the sump of the engine. Additionally, the pan is designed and constructed to serve as a structural component for improved powertrain bending.

The Viper V10 also includes a unique, race-proven swinging arm oil pickup that moves with relationship to G-forces encountered in tight-track turning conditions, acceleration and braking conditions.

Exclusive to the Viper, the swinging pickup moves within the oil pan to ensure that the maximum amount of oil is available to the engine without any losses due to side-to-side sloshing in the pan.

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

Oil change intervals are recommended at 9,650 kilometres. Pennzoil 0W40 synthetic motor oil is the exclusive lubricant recommended by SRT engineers for its ultra-low friction properties that contribute to the V10's higher performance. Crankcase capacity with filter change is 11.8 litres (10.5 quarts). A special SRT-designed oil filter is used with the 8.4-litre engine.

Intake assembly and cylinder heads

The intake assembly of the 8.4-litre Viper V10 is entirely new with the adaptation of a new, lightweight composite intake manifold that provides better fuel/air distribution, excellent thermal capabilities and reduced weight.

The new intake system features runners that are approximately 25 millimetres longer than the previous design, and the move to a composite construction from aluminum has reduced air charge temperatures significantly.

Pushrods are 10 per cent stiffer with wall thickness increased from 1.5 millimetres to 2.03 millimetres (.06 inch to .08 inch).

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

For 2013, new, electronically controlled twin throttles dramatically improve throttle response and control.

Like the block, cylinder heads are constructed of high-strength, T356 aluminum for superior strength. The combustion chambers have been computer numerical control (CNC) machined for improved flow and charge motion. Structural changes in the cylinder heads have been incorporated for 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. Sodium-filled exhaust valves, measuring 40.8 mm, are now used. The use of lightweight valves helps reduce reciprocating 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 that can lead to engine knock.

Valves are actuated by a single assembled camshaft in the 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 V10 is equipped with variable-valve timing (VVT) on the exhaust side.

Ignition is through 10 individual coil packs mated to dual-platinum spark plugs. Spark plugs have been designed for a 161,000 kilometre 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 provides a more distinct character at part throttle and 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 per cent.

Tremec TR6060 six-speed transmission

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

The new gear set also takes full advantage with a more useful sixth gear that is designed for more power at the higher rpm ranges of the engine.

Drivers will feel a notable improvement in shifting quality with shift throws that are nearly 12.5 per cent 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 tighter 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.

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.

Two hydromounts are used on the engine to help control vibration.

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.

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 expansion of the SRT vehicle lineup in the 2012 model year features four new products that are world-class performance contenders and bring the latest in safety technologies and creature comforts. These products include the Chrysler 300 SRT8®, Dodge Challenger SRT8 392, Dodge Charger SRT8 and Jeep® Grand Cherokee SRT8.

Making its highly anticipated return to the high-performance sports car market in late 2012 is the new 2013 SRT Viper and SRT Viper GTS. The SRT flagship performance machines arrive with more power and performance, superior craftsmanship, new technologies and creature comforts.

About Chrysler Canada Inc.
Founded as the Chrysler Corporation in 1925, Chrysler Canada Inc. is based in Windsor, Ontario, and celebrates its 87th anniversary in 2012. Chrysler Canada's product lineup features some of the world's most recognizable vehicles, including the Dodge Grand Caravan, Jeep® Wrangler, Chrysler 300 and Ram trucks.

Chrysler Canada is a wholly owned subsidiary of Chrysler Group LLC, one of the world's leading automotive companies. Chrysler Group LLC, formed in 2009 from a global strategic alliance with Fiat Group, produces Chrysler, Jeep®, Dodge, Ram Truck, SRT®, FIAT® and Mopar® vehicles and products. With the resources, technology and worldwide distribution network required to compete on a global scale, the alliance builds on Chrysler's culture of innovation – first established by Walter P. Chrysler in 1925 – and Fiat's complementary technology – from a company whose heritage dates back to 1899. Fiat will contribute world-class technology, platforms and powertrains for small- and medium-sized cars, allowing Chrysler Group to offer an expanded product line including environmentally friendly vehicles.

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