

New Corvette Engine Shatters Previous OHV RPM Limits

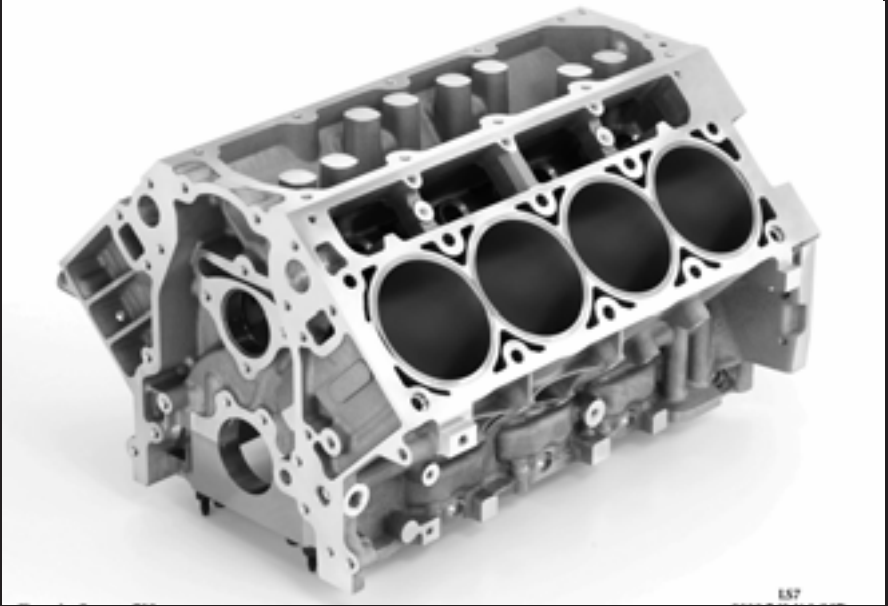


LS7 2006 7.0L V-8 (LS7) for Chevrolet Corvette Z06.

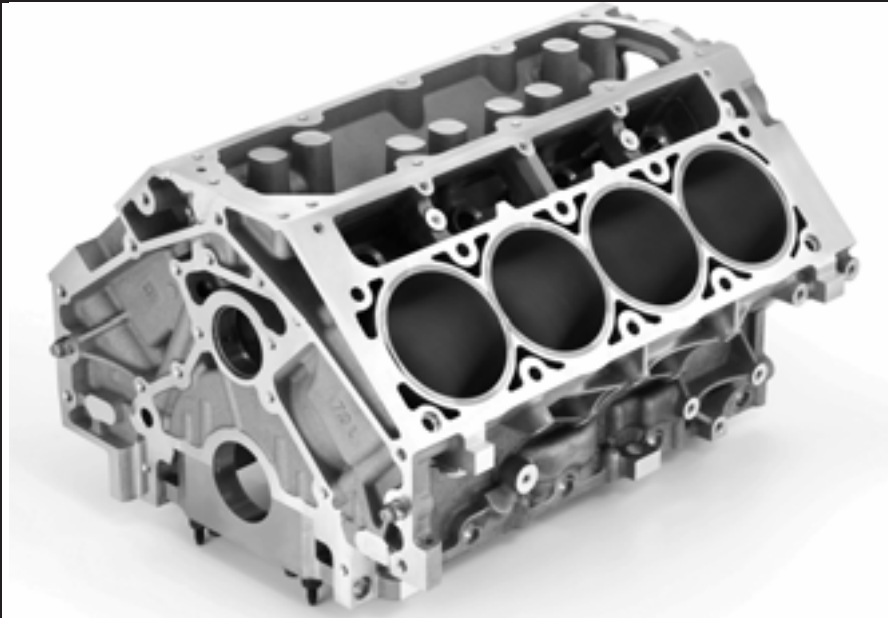
PONTIAC, Mich. - GM engineers have achieved a feat many speculated was not possible. The new LS7 7.0-liter OHV (overhead valve) V-8 engine for the 2006 Z06 Corvette will not only achieve 500 horsepower but will be capable of running up to 7100 rpm. The previous limit was 6600 rpm in the 6.0-liter LS2.

With this new engine GM is showing multi-valve overhead cam performance is achievable with a two-valve cam-in-block engine. For the new Z06, higher rpm allows the driver to remain in first gear to just over 60 mph, contributes to higher top speed and improves overall vehicle performance. The LS7 is one of the first automotive OHV production engines in the industry capable of over 7000 rpm.

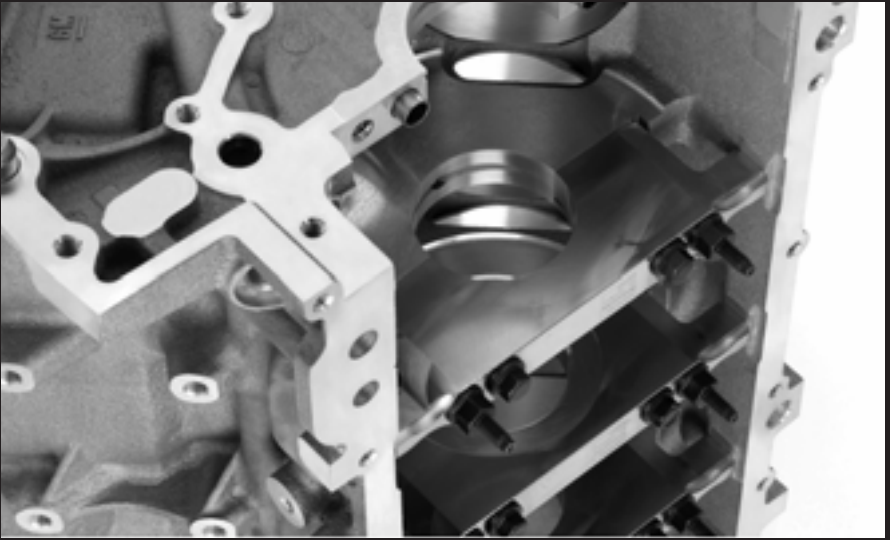
The new Z06's sub four-second 0-60 mph time is achieved in part by the extended rpm range and the ability to remain in first gear past 60 mph.



LS7 2006 7.0L V-8 (LS7) Engine Block - left front for Chevrolet Corvette Z06.



LS7 2006 7.0L V-8 (LS7) Engine Block - right rear for Chevrolet Corvette Z06.



LS7 2006 7.0L V-8 (LS7) Engine Block 'Crankcase Breathing Hole' detail for Chevrolet Corvette Z06.



LS7 2006 7.0L V-8 (LS7) Cylinder Head - Combustion Chamber with CNC Machining for Chevrolet Corvette Z06.



**LS7 2006 7.0L V-8 (LS7)
Cylinder Head - Exhaust
Ports for Corvette Z06.**



**LS7 2006 7.0L V-8 (LS7)
Cylinder Head - Intake
Ports for Corvette Z06.**



**LS7 2006 7.0L V-8 (LS7)
Cylinder Head - underside
view of Valves and Intake
Ports**



LS7 2006 7.0L V-8 (LS7) Piston and Connecting Rod Assembly for Chevrolet Corvette Z06.

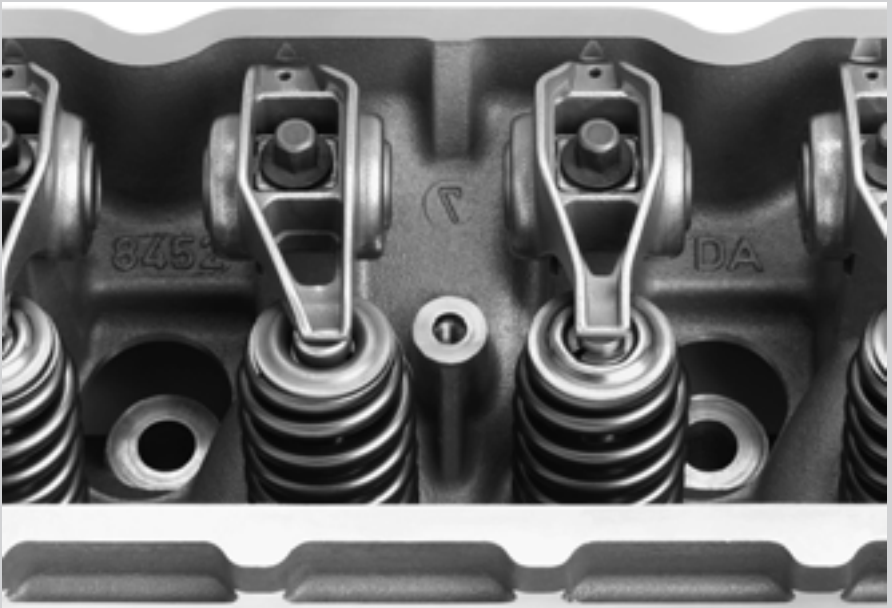
LS7 2006 7.0L V-8 (LS7) Titanium Connecting Rod for Chevrolet Corvette Z06.



LS7 2006 7.0L V-8 (LS7) Intake and Exhaust Valves for Chevrolet Corvette Z06.



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LS7 2006 7.0L V-8 (LS7) Cylinder Head - Offset Intake Rockers for Chevrolet Corvette Z06.



LS7 2006 7.0L V-8 (LS7) Offset Rocker Set for Chevrolet Corvette Z06.

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The over-190 top speed of the ZO6 is partially due to the speed capability of the engine. As aerodynamic drag becomes a factor at higher speeds, the capability to run higher rpm allows the transmission to be run in a lower gear generating more effective torque at the rear wheels. Also, having the ability to shift all gears at higher speeds improves elapsed times whether on a road course or drag strip.

"For a production engine to run at this high of an rpm blurs the lines even more between OHV and OHC (overhead cam) design," said Dave Muscaro, assistant chief engineer for small block engines. "We took a complete systems approach to achieve the high rpm. We have a tight valvetrain design along with some race-inspired materials for the reciprocating components like titanium intake valves and connecting rods."

OHV engines use pushrods to activate the valves via rocker arms, whereas with OHC engines the valves are typically actuated directly via finger followers. The extra mechanical movement and weight of the components of an OHV valvetrain present challenges to higher rpm. The LS7 design and use of lightweight, stiff components, along with GM's economy of scale, make higher rpm obtainable in a production OHV engine.

"The new LS7 cylinder head gave us the opportunity to design a new high-revving valvetrain," said Jim Hicks, LS7 valvetrain design engineer. "The new valvetrain had to be as stiff and light as possible to assist meeting the engine's aggressive performance targets without compromising idle quality and low emissions. Stiffness is increased with larger diameter pushrods and rocker arms optimized through extensive finite element analysis."

The LS7's 1.8:1 rocker arm ratio and titanium intake valves contribute to a lower effective mass (compared to the LS2 base Corvette engine) in spite of larger and stiffer valvetrain hardware. Idle quality and emissions performance is achieved with the help of a more aggressive cam that provides more lift and duration while still keeping overlap area to a minimum.



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"We consulted with our Motorsports group on numerous design aspects of the cylinder head design, said Hicks. "We adopted some of the latest ideas that have been successful in the Nextel Cup and the American Le Mans Series including valve centerline positions, valve angles, valve sizes and rocker arm ratio."

Due to the relatively large bore and stroke (104.8 x 101.6mm) of the LS7, light weight pistons, piston pins, titanium rods and a steel crankshaft are also used to achieve extended rpm. The flat top pistons with race-ready valve reliefs are 482 grams each and use a shortened lightweight piston pin. Each forged titanium rod weighs only 464 grams which is almost 30 percent less than each rod in the LS2. The forged steel crankshaft is stronger, stiffer and designed to handle high-speed loads.



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