

2009 "LS2" 6.0L V-8 (LS2)
6.0L V-8 (LS2) TRUCK ENGINE
2009 Model Year Summary

- **New introduction in the Saab 9-7X Aero model**

Carryover engine content and benefits from 2008 model year

Improved Timing Chain Dampener

Beginning in 2007, the LS2 V-8 timing chain has a new, leaf-spring type dampener that helps ensure smooth, quiet operation throughout the engine's life. The timing chain, which connects the cam and crankshaft and operates the valves, is validated beyond 150,000 miles of operation. Yet even the most durable chains stretch with time. In many engines they must be adjusted or replaced at scheduled intervals. The LS2's chain dampener maintains optimal chain tension for the life of the engine and eliminates any flapping motion that might develop as the chain stretches with mileage. It ensures that the timing chain operates as smoothly and quietly as new, even as the engine accumulates high mileage.

Oil Filter with Internal Bypass

Beginning in 2007, the LS2 V-8's oil filter now features an internal filter bypass. The bypass is a safety device that protects the engine in the event the filter is neglected for an extended period of time. If the filter becomes completely clogged with debris, the bypass opens and does not allow the filter to restrict oil flow through the engine.

Previous LS2s had the bypass mechanism installed in the oil pan. Moving the bypass to the filter improves engine assembly efficiency and insures that the mechanism is fresh and unobstructed each time the filter is changed.

Overview

Before the advent of the LS7 V-8 for the Corvette Z06, the LS2 was the most sophisticated, most powerful overhead-valve V-8 in production. GM Powertrain's 90-degree small-block car engines remain unique in the automotive world: high-tech, aluminum-intensive, ultra-high-performance cam-in-block V-8s. Measured by mass, package size, performance or cost to the customer, the 6.0L LS2 matches or surpasses the world's best overhead-cam V-8s.

The LS2 launched the fourth-generation of GM's small-block V-8 in the 2005 Corvette. The development target was 400 horsepower, determined by the sixth-generation Corvette's projected drag coefficient of .28. With 400 hp the all-new Corvette could achieve a top speed of 180 mph. Powertrain engineers hit the target, and the LS2 was subsequently installed in other high-performance vehicles, including the Cadillac CTS-v and Chevrolet Trailblazer SS

To reach their output objective, engineers increased displacement compared to the LS1 V-8 that powered the previous-generation Corvette. The LS2's bore was enlarged from 99 to 101.6 mm; with the same 92 mm stroke, the LS2 displaces 6.0 liters (364.3 cubic inches), compared to the 5.7-liter LS1.

Like its predecessor, the LS2 starts with a precision sand cast aluminum cylinder block,

cooled at a precise rate during the casting process to increase strength. This was the first Gen IV block, with external knock sensors, and a deep-skirt design that helps maximize strength and minimize vibration. The bulkheads accommodate six-bolt, cross-bolted main-bearing caps that limit crank flex and stiffen the engine's structure. A structural oil pan further stiffens the powertrain. To improve durability in the bottom end, the LS2 features polymer-coated pistons with floating wrist pins. To reduce friction as the pistons move through the cylinder bore, piston ring spring tension has been reduced.

Air in, air out: To take advantage of the displacement increase, the LS2's cylinder heads and intake and exhaust systems were improved. The valve train was reviewed to reduce friction and, with the application of stronger valve springs, engine speed increased from 6000 to 6500 rpm. The new heads applied flow characteristics developed in the Corvette C5R racing program. The shape of the combustion chambers was optimized; with new flat-top pistons, the compression ratio increased to 10.9:1 (compared to 10.1:1 in the LS1). A higher-lift cam was introduced, and the electronic throttle body was enlarged from 75 mm to 90 mm. It is mounted to a new multi-piece welded composite intake manifold tuned to improve airflow. The substrate in the catalytic converter was improved to reduce exhaust restriction.

Moreover, the smaller, close-coupled "pup" converters used on the LS1 were eliminated with the LS2. This was largely a function of placing the LS2 one inch further forward in the Corvette chassis. The move allowed enough room to move the main catalysts forward, closer to the exhaust manifolds, where they reach full operating temperature, or light-off, more quickly. When it was introduced in the 2005, the LS2 met projected tailpipe emissions standards through 2008.

Even with its high compression ratio and high-lift cam, the LS2 V-8 is exceptionally tractable, with even torque delivered throughout its rpm range. And while peak output is measured on premium fuel, its advanced control system and efficient combustion chamber design allow the LS2 to operate safely on pump fuel as low as 87 octane.

And even with its performance and high-speed potential, the LS2 requires minimal maintenance. Its advanced iridium-core spark plugs and Dexcool coolant are validated to 100,000 miles of operation. It features an oil-level sensor and GM's advanced Oil Life System. This technology measures stress on the engine and calculates oil life based on real-world use rather than a predetermined mileage interval. It eliminates unnecessary oil changes in vehicles that are driven in light duty conditions.

The LS2 development team hasn't rested on its laurels. A year after this new V-8 was introduced, it was equipped with Powertrain's next-generation controller. The E38 engine control module (ECM) uses a 32-bit processor, with more memory and a host of advanced features compared to previous controllers. This ECM orchestrates a more advanced timing system, with a 58X crankshaft position encoder and sensor that provide more immediate, accurate information on the crankshaft's position during rotation. This allows the E38 to adjust ignition timing with greater precision, which optimizes performance and economy. In conjunction with the 58X crankshaft timing, the LS2 was equipped with the latest digital cam-timing technology. The cam sensor was relocated to the front engine cover, and it reads a 4X sensor target on the cam sprocket. The target ring has four equally spaced segments that communicate the camshaft's position more quickly and accurately than previous systems with a single segment. The dual 58X/4X measurement ensures extremely accurate timing for the life of the engine, and it

provides an effective back-up system in the event one sensor fails.

For all the LS2 V-8's sophistication, the bottom line is simple. This engine has wowed both the business and auto-enthusiast press because there is no arguing with results. The LS2 exceeds customer expectations with outstanding overall performance at reasonable cost to both the customer and the corporation.