

2011 Shelby GT500 Powertrain

- 2011 Mustang V-6 now rivals world-class sports coupes with a 305-horsepower, 30 mpg 3.7-liter V-6 engine using Twin Independent Variable Camshaft Timing (Ti-VCT) as standard equipment
- 5.0-liter V-8 returns in Mustang GT, now with 32 valves, Ti-VCT and 412 horsepower
- Shelby GT500® gets a Ford GT-inspired aluminum block for its 5.4-liter supercharged V-8, leading to lighter weight, 550 horsepower and top performance
- Six-speed manual and automatic transmissions get the power to the ground more efficiently, helping improve drivability and fuel economy

For the 2011 model year, the legendary Ford Mustang once again flexes its muscles with three all-new, state-of-the-art powertrains delivering marked gains in both fuel economy and power.

The 2011 Mustang coupe and convertible arrive with a 305-horsepower 3.7-liter V-6 engine with Ford's new advanced engine valvetrain technology – Twin Independent Variable Camshaft Timing (Ti-VCT) – as standard equipment. Performance-minded buyers opting for the Mustang GT are treated to an all-new 5.0-liter, 32-valve V-8 with Ti-VCT, good for 412 horsepower. And the no-compromises Shelby GT500 gets a Ford GT-based aluminum block for its 5.4-liter supercharged V-8, leading to lighter weight and 550 horsepower.

“These three new engines represent a quantum leap in rounding out a world-class Mustang powertrain portfolio,” said Derrick Kuzak, group vice president, Global Product Development. “Each represents Ford’s commitment to use technology to deliver the performance and fun-to-drive factor customers demand, while continuously improving fuel economy.”

3.7-liter Ti-VCT V-6

For 2011, Mustang’s new 305-horsepower 3.7-liter Duratec® 24-valve V-6 uses advanced engineering to deliver its power and economy. Ti-VCT adjusts the valvetrain in microseconds, while aluminum construction means less weight.

The high output is due largely to Ti-VCT, which allows variable control of valve operation across the rev range. The variable cams operate on a Direct Acting Mechanical Bucket (DAMB) valvetrain using polished buckets to reduce friction.

The end result is as much as a 3 percent improvement in fuel economy and a 10 percent improvement in power output versus traditional engines without these advanced features. In fact, Mustang V-6 achieves EPA-estimated fuel economy of up to 30 mpg highway along with its 305 horsepower.

Ti-VCT is complemented by specially tuned composite upper and lower intake manifolds for efficient air delivery and lighter weight. Ignition power is delivered by a high-energy coil-on-plug design, while piston-cooling jets and a lightweight die-cast aluminum cylinder block improve the durability and efficiency of the 3.7-liter V-6 design.

Performance was the mantra for every aspect of engine design. A cold air induction system and dual exhaust give the 3.7 its free-breathing style with a 7,000-rpm redline and near-instantaneous response to throttle inputs.

A die-cast aluminum deep-sump oil pan provides 10,000-mile oil change intervals, saving drivers money on maintenance and resulting in less waste in oil disposal.

Engineers also worked to ensure that aggressive, high-performance sounds come from the new

engine, from intake to exhaust. Not only does the retuned air intake system minimize losses, it also provides the driver with a satisfying intake rush on hard acceleration. The all-new dual exhaust system is mellow at idle but opens up with a howl at full-tilt, letting Mustang drivers know they're behind the wheel of a world-class sports coupe.

5.0-liter Ti-VCT V-8

The modern 5.0-liter four-valve Ti-VCT V-8 engine in the new Mustang GT will deliver 412 horsepower and 390 ft.-lb. of torque. At the same time, fuel economy is projected to be better than the previous model and unsurpassed in the segment – up to 25 mpg highway with Mustang's six-speed automatic transmission.

As with Mustang V-6, a critical element in the 5.0-liter V-8's ability to deliver 412 horsepower – with improved drivability, tractability and fuel economy over the 2010 Mustang GT powertrain – is enhanced Ti-VCT.

For a high-performance application, the team specified cam torque-actuated variable camshaft timing. Using existing cam torque energy, with assistance from pressurized oil, meant that minimal upgrades to the oil pump were required, resulting in less parasitic drag. Increased volumetric and thermal efficiency gives faster Ti-VCT response at all engine speeds.

During the new 5.0-liter's development phase, camshaft lift profile and port optimization started with higher-lift Ford Racing aftermarket units, modified for compatibility with various four-valve-per-cylinder heads. Extensive CAE and dynamometer testing was performed to fine-tune camshaft events and port flow for performance and fuel efficiency in conjunction with the variable camshaft timing.

The resulting all-new aluminum four-valve-per-cylinder heads feature a compact roller finger follower valvetrain layout leaving more room for high-flow ports for free-breathing performance. Head structure was designed to support higher cylinder head pressures and cross-flow cooling for sustained high-rpm use. Head bolt size was increased from 11 to 12 millimeters to contain the higher combustion pressures.

The aluminum block was developed for optimized windage and oil drainback under lateral conditions and high rpm, such as a track-day outing for enthusiastic owners and drivers. Increased main bearing bulkhead widths and nodular iron cross-bolted main bearing caps with upsized bolts also were used to accommodate the significant performance increase.

An additional element is the increased capacity and baffling of the deep-sump stamped steel oil pan to enable sustained high-rpm use and offer the convenience of 10,000-mile oil change intervals. Piston-cooling jets also were incorporated for performance-minded customers and for faster oil warm-up on cold start.

Supercharged 5.4-liter aluminum-block V-8

The 2011 Shelby GT500 is powered by an all-new aluminum-block 5.4-liter supercharged V-8 engine offering a weight savings of 102 pounds off of the outgoing cast-iron block. The weight reduction helps improve fuel economy, acceleration, handling and steering precision.

Advanced engine manufacturing techniques and refined tuning help produce 550 horsepower – 10 hp more than the 2010 model – and 510 ft.-lb. of torque. And, through engine improvements and aerodynamic refinements, the 2011 GT500 will be the first GT500 to achieve fuel economy numbers that will allow it to avoid gas guzzler tax.

The lighter aluminum block is reinforced with structural webbing, unique bulkhead chillers and strong six-bolt billet main bearing caps for high-performance durability in extreme conditions. Additional intercooler surface area helps drop intake air temperatures; the resulting cooler, denser

intake air helps bump horsepower and torque for better performance.

The 5.4-liter aluminum-block engine uses a Ford-patented Plasma Transferred Wire Arc (PTWA) cylinder liner coating, a process that applies a 150-micron composite coating containing nanoparticles on the internal surfaces of engine cylinder bores, replacing the cast-iron liners typically used in aluminum engine blocks.

The PTWA process uses air and electricity to create a plasma jet of 35,000 degrees Fahrenheit, which melts a steel wire that is fed into a rotating spray gun. Using atomized air, the melted steel wire is blown onto the engine cylinder bores, which have been specially machined to receive the coating. In the process of melting and applying the metal to the surface, the steel wire oxidizes, creating a composite consisting of both iron and iron oxide.

PTWA coating offers improved overall performance and durability versus iron liners, along with functional benefits of reduced friction between piston rings and cylinder bores, improved heat transfer due to increased surface contact area, and a weight savings of 8.5 pounds versus a typical sleeved aluminum block.

New six-speed manual and automatic transmissions

Drivers can get the most out of Mustang's new engines using either an all-new six-speed manual gearbox or a six-speed automatic transmission (not available on Shelby GT500). Both come with the flexibility and fuel economy benefits of six forward ratios regardless of whether buyers want to shift for themselves or not.

Drivers who prefer a manual gearbox will enjoy the short throws and direct feel of the shifter along with the relaxed cruising permitted by the extra top gear ratio. Customers choosing the automatic will be pleasantly surprised to find the advanced six-speed transmission does not sacrifice fuel economy – or performance – for convenience, delivering optimized mileage with crisp, quick shifts that maximize torque and horsepower.

The new automatic transmission also features a grade-assist or “hill mode” to improve drivability on hilly terrain. This technical innovation uses vehicle input – acceleration, pedal position, vehicle speed and brake status – to automatically determine the correct gear ratio while on an incline or decline. Hill mode eliminates sixth gear, extends lower gear operation on uphill climbs and provides additional grade or engine braking for coast-downs.