

2005 Mustang Convertible Powertrain



*"Mustang owners have always known – and bragged about – what was under the hood. With the new 300-horsepower, three-valve 4.6-liter MOD V-8, we're giving them plenty to brag about – again."
– Terry Wagner, Manager, Ford Modular V-8 Engines*

Sometimes, choosing a convertible over a coupe means accepting compromises in performance. Because of some convertibles' vastly increased weight or reduced structural integrity over their derivative counterparts, manufacturers often restrict high-performance engine choices or the availability of a manual transmission. They may even soften the suspension or change final drive ratios – all in an effort to retain reasonable drivability, durability and fuel economy in convertible models. Such are the evils associated with the weight added (often 300 pounds or more) during the conversion of a typical hardtop into a drop top – much of it due to tacking on structural reinforcements to make up for the lack of roof structure.

FULL-STRENGTH FOR YOUR DRIVING DESIRES

But this is not the case with the 2005 Mustang convertible. Its body structure was engineered from the beginning as both coupe and convertible, adding only 175 pounds over the coupe. As a result the 2005 Mustang convertible doesn't compromise when it comes to performance – either with powertrain choices or in the handling department. The 4.6-liter V-8 engine standard in the Mustang GT coupe makes the same 300-horsepower in the Mustang GT convertible. The same applies to the 210-horsepower 4.0-liter V-6 available in the base coupe and convertible.

The GT's new 4.6-liter, three-valve MOD V-8 packs 40 more horsepower than the previous generation Mustang V-8 and over 50 percent more power than the fiery small-block 289-cubic-inch V-8 that propelled the 1964 model to stardom. This newfound power – on regular gas – is made possible by intelligent application of modern technology, including all-aluminum construction and a new head design that incorporates three valves per cylinder and variable cam timing.

TECHNOLOGY SADDLES UP 300 HORSEPOWER

"We are very proud of the new Mustang V-8," says Terry Wagner, manager, Ford modular V-8 engines. "Enthusiasts



are thrilled at how it takes the MOD V-8 to a new level, and brings 300 horsepower to the masses."

The V-8's deep-skirt, lightweight aluminum engine block provides optimum stiffness and strength, saving 75 pounds compared with a cast-iron design. Computer-aided engineering was used to reinforce key areas of the block, adding rigidity without the increased weight.

With 281 cubic inches of displacement, the Mustang GT engine generates more than 65-horsepower per liter. This compares with the 42-horsepower per liter that wowed enthusiasts when Ford first wedged a small block 289-cubic-inch V-8 and four-barrel carburetor into the Mustang in 1964.

One of the keys to producing 300 horsepower from this relatively small displacement is Mustang's new single-overhead-cam, three-valve cylinder design with variable cam timing. The new head gives the engine a higher compression ratio than previously possible on 87 Octane gasoline.

Because more airflow means more engine output, the V-8's heads use two intake valves per cylinder to move more air into the engine. A new, tuned-length exhaust manifold offers optimized exhaust flow to help scavenge burned gases from the cylinders.

The center-mounted sparkplug is placed to provide a symmetrical flame. Longer and narrower than previous designs, it can extend to the center of the cylinder head, while leaving as much room as possible for the valves. The compact coil-on-plug ignition system frees space under the hood and allows more precise spark control.

The three-valve heads are smaller than the previous two-valve heads, reducing weight, but offering a more direct, "ported" style path to the valves for better airflow at peak engine speeds. Magnesium cam covers suppress valvetrain noise and reduce weight. Taking weight out of the top of the engine helps to lower Mustang's center of gravity and improve handling.

VCT – THREE LETTERS THAT MEAN MORE POWER

Variable camshaft timing (VCT) was the key technology to wringing more power out of the engine, while simultaneously improving efficiency and reducing emissions. VCT allows the valves to operate at optimum points in the combustion cycle, tailored to the engine's speed and load at that instant.

The Mustang VCT system allows up to 50 degrees of cam variation in relation to the crankshaft angle. Ford's "dual-equal" variable cam timing design shifts the timing of both the intake and exhaust valves together, with a single camshaft per cylinder head. This provides all the benefits of – but creates far less complexity and adds less weight than – VCT systems that actuate the intake valves separately.

The cams operate both sets of valves using low-profile roller-finger followers, helping reduce friction and keeping the overall engine height – and thus, Mustang's distinctive hoodline – low. Cam position is controlled by an electronic solenoid that modulates oil pressure to advance or retard the cam timing based on input from the engine's electronic control computer.

4.0-LITER SOHC V-6: ECONOMICAL PERFORMANCE

With technologies such as electronic throttle control, traction control and an available five-speed automatic transmission, the Mustang's new 4.0-liter SOHC V-6 powertrain is anything but basic. And with 210 horsepower and 240 foot-pounds of torque, the V-6 engine offers real Mustang performance at a more attainable price.

The 4.0-liter V-6 offers quieter and smoother performance, higher output and more compact

packaging than the previous Mustang's 3.8-liter pushrod V-6. It features low-profile heads with single overhead cams driven by a slave shaft mounted in the "Vee" of the engine. The result is a lower overall engine height than a conventional overhead cam setup. The 4.0-liter V-6 gets a new composite intake manifold, a unique camshaft grind, new tuned-length exhaust manifolds, plus a new flywheel and oil pan.

Engineering attention also was paid to noise-reducing features including a girdled crankcase for increased strength and rigidity, a dual-mode crankshaft damper, coated skirt pistons, optimized bearing clearances and isolated composite cam covers.



A MUSTANG FIRST – FIVE-SPEED AUTOMATIC

For the first time in its storied history, Mustang is available with a five-speed automatic transmission. The 5R55S automatic, also used in the Lincoln LS and Ford Thunderbird, has closely spaced ratios that keep the engine in its power band to produce better acceleration, with a wide ratio span that provides impressive highway fuel economy. A new powertrain control computer delivers benefits in the transmission, as well as the engine, by precisely controlling shift duration and shift timing. Throttle position, engine speed, load, environmental factors and other parameters guide the transmission shift schedule.

A new electronic interface lets the powertrain control module communicate with the automatic transmission ten times faster than before. As a result, the entire powertrain works together to deliver smooth performance.

SWITCHING GEARS, TREMEC STYLE

For those who prefer to select their own shift points, five-speed manual transmissions are standard on both the V-6 and GT versions of the 2005 Mustang convertible and coupe.



The V-8 powered GT is equipped with a rugged Tremec 3650 gearbox; the V-6 Mustang gets a Tremec T-5 manual. Both have been improved for greater shift quality and efficiency. For example, they now use a flange coupling instead of a splined drive with the driveshaft, resulting in better balance and reduced driveline lash (the "clunk" that is sometimes heard when engine torque is applied or released into the transmission, driveshaft or rear axle.) An all-new shift linkage is designed to provide quick engagement of the gears producing a solid feel and none of the "notchiness" of the past.

A hydraulic clutch reduces pedal effort while still offering a performance feel. The V-6 clutch has new plate materials for durability, and the V-8 clutch has been enlarged to handle the engine's 300 horsepower.

TRACTION CONTROL WHEN NEEDED



Five-speed manual transmissions with improved shift quality are standard on both V-6 and GT versions of the 2005 Mustang convertible.

Under some conditions, Mustang drivers may find they need a little help in harnessing all the excitement the 2005 convertible model has to offer.

That's where the all-speed traction control system comes in. Standard on GT with the anti-lock braking system (ABS), the traction control system takes advantage of Mustang's high-speed communication network by using sensor information supplied by the engine controller and the ABS system. In turn, the electronic throttle system and brake system work smoothly in concert to reduce wheel spin.

But this is a muscle car, after all. Consequently, Mustang's traction control is tuned a little differently than most. On dry pavement, the system allows more wheel slip under acceleration, so you can still "hang it out" a bit when driving gets spirited. When the system detects slippery conditions, it acts more aggressively to help maintain greater stability.

On those occasions when traction control isn't desired – such as a smoky burnout at the drag strip – drivers can deactivate the system with a push of a button conveniently located on the instrument panel's center stack, just to the right of the gauges.