

2007 Explorer Sport Trac Powertrain

SPORT TRAC'S FIRST-EVER V-8 OFFERS THE MOST POWER IN ITS CLASS

- V-8 models feature a class-exclusive 6-speed automatic for increased performance and fuel economy that rivals competitors' V-6 powertrains
- Improved 4.0-liter V-6 delivers 210 hp, yet meets same federal Tier II, Bin 4 emissions rating as the Ford Escape Hybrid
- Full-featured Control Trac® 4x4 system offers automatic torque split and low-range transfer case

The 2007 Ford Explorer Sport Trac showcases Ford Motor Company's philosophy that advanced engine technologies can improve both performance and the environment.

For example, the Sport Trac's standard 4.0-liter V-6 engine now meets federal Tier II, Bin 4 tailpipe emissions, the same as the Ford Escape Hybrid.

For the first time, the Sport Trac is available with a V-8 engine. The 4.6-liter, three-valve V-8 is the most powerful engine in its class, delivering 292 horsepower. In addition, the V-8 is paired to the only six-speed automatic transmission in its competitive set. As a result, the new 2007 Sport Trac V-8 powertrain is expected to deliver more than 20 miles per gallon on the highway, for fuel economy that rivals or beats that of the competition's V-6 powertrains.

"Performance and fuel economy can go hand-in-hand if you invest in the right technologies," says Dave Szczupak, vice president, Powertrain Operations. "That's why Ford is investing in six-speed automatic transmissions, electronic throttles, variable cam timing and other advanced powertrain technologies."

Ford has a leadership position in powertrain technologies such as six-speed automatic transmissions to simultaneously boost performance and fuel economy without necessarily going to larger engines. This investment in technology is particularly appropriate in the SUV market, where Ford is increasing capability without resorting to larger-displacement engines that consume more fuel.

"The new V-8 and six-speed automatic drivetrain is a tremendous advantage for the 2007 Sport Trac," says Raj Nair, SUV and Body-on-Frame Vehicles executive director. "Not only does it offer more power, more refinement and better fuel economy, but it also offers increased utility. The additional power output delivers impressive payload capacity and towing capacity – up to 1,390 pounds and 6,800 pounds, respectively."

4.6-liter V-8 with variable cam timing, provide Explorer with best-in-class power

For Sport Trac enthusiasts, the most significant powertrain improvement will be the introduction of the V-8 engine.

"Customers have been asking for a V-8 since day one," says Bryan Olson, Sport Trac marketing manager. "These customers want the added capability and towing capacity, as well as the power and performance that only a V-8 can deliver."

The new 4.6-liter V-8 features three-valves per cylinder and single overhead cams with variable cam timing. These features are common with the highly lauded 2005 Ford Mustang GT as well as the 5.4-liter V-8 in the F-Series pickups and Expedition. With the introduction of the 2006 Explorer and 2007 Sport Trac, Ford Motor Company is approaching one million three-valve V-8s produced. This multi-application approach to Ford's "modular" V-8s delivers benefits in manufacturing efficiencies, proven customer reliability and performance.

In the Sport Trac, the 4.6-liter V-8 delivers 292 horsepower at 5,570 rpm, and 300 pound-feet of torque at 3,950 rpm.

The three-valve heads enable a higher compression ratio on regular grade 87 Octane gasoline. Two of each cylinder's three valves are intake valves, because more airflow into the engine means more power output. A new, tuned-length exhaust manifold offers optimized exhaust flow to help scavenge burned gases from the cylinders.

The three-valve heads feature center-mounted spark plugs that offer three benefits:

- Placing the spark plug in the center of the cylinder provides symmetrical flame for more complete fuel combustion. This extracts more power from the engine while decreasing the amount of unconsumed fuel in the exhaust system, resulting in low emissions
- A longer and narrower spark plug design enabled powertrain engineers to use larger-diameter valves, for increased economy and performance
- The compact coil-on-plug ignition system enables the powertrain control module (PCM) to more precisely control the spark, again for improved efficiency

The three-valve heads are smaller and lighter than equivalent four-valve heads. Their large dual-intake ports provide a direct path to the twin intake valves for better airflow at peak engine speeds. At lower speeds and loads, a charge motion control valve (CMCV) closes, increasing air velocity and in-cylinder motion for optimum fuel economy. Likewise, lightweight intake and exhaust valves reduce inertia for high-speed performance capability, while enabling lower friction for fuel economy. The cylinder heads are capped with lightweight magnesium cam covers that help suppress valvetrain noise.

The ABCs of VCT

Variable camshaft timing (VCT) plays an important part in generating more power as well as improving efficiency and reducing emissions.

The 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 variable valve timing – but creates far less complexity and adds less weight than VCT systems that actuate the intake valves separately.

The cam in each cylinder head operates both sets of valves using low-profile roller-finger followers, helping reduce friction. The powertrain control module (PCM) directs solenoids to alter the oil flow in the hydraulic cam timing mechanism, which rotates the camshafts in relation to their drive sprockets. The unit can shift between fully advanced and fully retarded in milliseconds.

The result is enhanced efficiency under low-load conditions, such as at idle or highway cruising, and increased power for brisk acceleration for times at high demand.

Class-leading six-speed automatic transmission

The 4.6-liter V-8 comes standard with a new six-speed 6R automatic transmission, introducing transmission technology normally found only in luxury vehicles to the Sport Utility Truck market.

For the best possible shift quality, each 6R transmission is bench tested at Ford's Livonia (Mich.) Transmission Plant. There, the transmission build quality is verified, detecting even minute variabilities in the manufacturing process which would normally lead to changes in shift feel. However, the 6R's electronic controller is programmed with its own unique software to account for these variances, producing smooth, precisely controlled shifts that improve durability and customer

satisfaction.

The electronically controlled transmission offers the smooth shift quality of a luxury car, but is fully tested for heavy-duty use. Not only does it execute shifts seamlessly, but it also contributes to the impressive towing capacity of the V-8 drivetrain. For example, the torque-converter assembly features three friction plates with improved durability and increased cooling flow for heavy-duty, high-load use.

For the first time on Sport Trac, the transmission selector is mounted on the center console (rather than the steering column). Configured in this way, the transmission can be shifted manually with crisp response, thanks to complete electronic solenoid control of the clutch elements. Lastly, focalized transmission mounts mean an even greater reduction in NVH levels. The 6R has a 6.04:1 gear-ratio span, compared to the V-6 model's five-speed 5R55W5 automatic with a span in the range of 4.5:1. The wide ratio span and the extra gear of the 6R enable the engine to spend more time in the optimum powerband: either at peak power for acceleration, or at peak efficiency for more fuel economy.

The 4.6-liter overhead-cam V-8 delivers 292 horsepower and is expected to deliver more than 20 miles per gallon on the highway. In addition, the Sport Trac's new V-8 engine meets federal Tier II Bin 5 standards, which is compliant with California's Low Emissions Vehicle II (LEV II) standards.

Cleaner emissions on standard V-6 engine

The 4.0-liter V-6 features single-overhead cams and two valves per cylinder. For 2007, it's rated at 210 horsepower at 5,100 rpm and 254 pound-feet of torque at 3,700 rpm. The torque curve is designed to be relatively flat across the entire engine range and to provide strong performance at nearly any engine speed. An equal-length composite plastic intake system improves sound quality.

New camshafts and spark plugs contributed to a 50 percent improvement in idle quality. Also, new engine calibrations and improved emissions controls cut smog-forming emissions by 74 percent.

"The new design reduces the complexity and cost of emissions controls while making a substantial cut in NOx emissions," says emissions system manager Joel Beltramo.

The new system cuts emissions of nitrous oxides to 3.6 pounds per 15,000 miles, from 14.2 pounds by its predecessor – a 74 percent reduction. As a result, the 2007 Sport Trac with the standard V-6 engine is certified to the same federal tailpipe emissions standards as Ford Escape Hybrid.

To achieve the emissions reduction, the catalyst assemblies were moved closer to the engine's exhaust manifolds because "hotter is better" for neutralizing NOx and other exhaust gasses. The air-fuel mixture of the V-6 was also recalibrated to stay in the catalyst systems' "sweet spot," with no loss of horsepower, torque or fuel economy.

The V-6 engine comes with a five-speed automatic transmission. The wide-ratio five-speed 5R55W provides good acceleration and fuel economy. In addition, the 5R55W has a single aluminum transmission casting that greatly reduces NVH and powertrain bending at higher speeds. To reduce noise, it utilizes a quieter oil pump and planetary gear designs.

Full-featured Control Trac® four-wheel drive delivers automatic torque transfer, and torque-multiplying low range

All Sport Trac 4x4 models now feature the advanced Control Trac® four-wheel-drive system with electronic logic controlling a two-speed transfer case.

Unlike competitive systems, Control Trac® operates automatically, and only when additional traction is needed. This increases safety and security without compromising fuel economy or NVH.

This makes the new Control Trac system a big advantage for the Sport Trac, according to John Davis, Sport Trac vehicle engineering manager:

“Most of the compact trucks offer a fairly simple, mechanical part-time four-wheel-drive system. These systems require some sort of operator input to engage them. And when four-wheel drive is engaged, most are not suitable for driving on partially dry pavement.

“The Honda Ridgeline offers an automatic torque split, but it is front-wheel biased, meaning power is transferred from the front-wheels back. And it lacks a low-range for heavy-duty use.”

	Ford Sport Trac	Dodge Dakota	Nissan Frontier	Toyota Tacoma	Chevrolet Colorado	Honda Ridgeline
Standard 4x4 System	Control Trac® Full-time 4WD	Part-time Electronic 4WD*	Part-time 4WD	Part-time 4WD	Insta Trac Part-time 4WD	Variable Torque Management
Automatic Torque Split	Standard	Not Available	Not Available	Not Available	Not Available	Standard
Transfer Case	Standard	Standard	Standard	Standard	Standard	Not Available

* Electronic-shift, full-time 4WD optional on SLT and Laramie models with automatic transmissions.

Control Trac® allows a driver to select between three driving modes:

- The 4x4 AUTO (or A4WD) mode engages the transfer case clutch as required to provide maximum traction in all driving conditions. The system constantly monitors throttle, steering, and wheel speeds to determine the required level of clutch activation. This mode is appropriate for any driving condition.
- The 4x4 HIGH (4H) mode effectively locks the transfer case clutch, maintaining the same speed for the front and rear driveshafts. It is intended only for severe winter or off-road conditions, such as deep snow, ice and shallow sand.
- The 4x4 LOW (4L) mode locks the transfer case clutch and engages a torque-multiplying gear set in the transfer case. It is intended only for off-road conditions that require extra power, including deep sand, steep grades, and towing a boat trailer out of water.

These powertrain changes help Sport Trac retain its leadership in the four-door, sport-utility truck category it created. By continuing to offer genuine truck capability to tow or go off-road without compromising fuel economy, refinement, or performance, the Sport Trac remains the benchmark of its class.

Electronic-shift, full-time optional on SLT and Lariat with automatic transmission.

About Ford Motor Company

Ford Motor Company, a global automotive industry leader based in Dearborn, Mich., manufactures and distributes automobiles in 200 markets across six continents. With more than 327,000 employees and 110 plants worldwide, the company’s core and affiliated automotive brands include Aston Martin, Ford, Jaguar, Land Rover, Lincoln, Mazda, Mercury and Volvo. Its automotive-related services include Ford Motor Credit Company and Hertz. For more information regarding Ford’s products, please visit www.fordvehicles.com.