# How to Use This Section

Knowing your products and how to quickly obtain answers to customers' questions is key in establishing a successful advisory relationship. In this section — which is devoted to the major powertrain features in all Ford passenger cars — you will find information on:

- Power team availability
- Powertrain components
- Engines and specifications
- Transmissions (rear-wheel drive) and transaxles (front-wheel drive)

# Available Powertrains — Car

| Vehicle | Engine | Fuel Delivery System | Manual Transmission/ Transaxle | Automatic Transmission/ Transaxle |
|---|---|---|---|---|
| Escort Sedan | 2.0L SOHC 8V I-4 | SEFI | G5M | F4EM |
| Escort ZX2 | 2.0L DOHC 16V I-4 (Zetec) | SEFI | G5M | F4EM |
| Focus | 2.0L SOHC 8V I-4<br>2.0L DOHC 16V I-4 (Zetec) | SEFI<br>SEFI | G5M<br>MTX75 | —<br>4F27E |
| Contour | 2.0L DOHC 16V I-4 (Zetec)<br>2.5L DOHC 24V V-6 (Duratec) | SEFI<br>SEFI | MTX75<br>MTX75 | CD4E<br>CD4E |
| Mustang | 3.8L OHV 12V V-6<br>4.6L SOHC 16V V-8 | SEFI<br>SEFI | T50D<br>T45 | 4R70W<br>4R70W |
| Taurus | 3.0L OHV V-6 (Vulcan)<br>3.0L DOHC 24V V-6 (Duratec) | SEFI<br>SEFI | —<br>— | AX4S<br>AX4N |
| Crown Victoria | 4.6L SOHC 16V V-8 | SEFI | — | 4R70W |
| Windstar Van and Wagon | 3.0L OHV 12V V-6<br>3.8L OHV 12V V-6 | SEFI<br>SEFI | —<br>— | AX4S<br>AX4S |

# Engines

## 2.0L SOHC 8V I-4 with SPI (Escort Sedan, Focus LX, SE and SE Wagon)

Escort and Focus have a fuel-efficient Single Overhead Cam I-4 split-port induction (SPI) 2000 engine. The engine comes standard with a five-speed manual transaxle on Escort, Focus, Focus LX and SE; a four-speed automatic transaxle is optional on Escort, Focus LX and SE and is standard on SE Wagon.

Major features and benefits:

- SPI emulates multi-valve engine performance, enabling this I-4 to maximize horsepower and torque while maintaining excellent fuel economy and required emissions levels
- The split-port induction system uses a cylinder head with two intake runners per cylinder. These runners carry the air charge to the intake side of the combustion chamber. At lower engine speeds, the air charge is directed through a narrow pathway that results in higher air velocity — quickening engine response, optimizing fuel efficiency and helping to reduce emissions. As engine speed increases above 3000 rpm, the second runner is opened. The increased volume of air allowed by this second path works to further enhance engine power and operating efficiency
- Because the SOHC design eliminates the need for pushrods, the system is less complex and has fewer parts
- Platinum-tipped spark plugs help provide sure-fire ignition and contribute to a 100,000-mile scheduled tune-up interval.(1) The metal platinum retains its conductive properties much longer than traditional spark plugs, thereby increasing reliability over the years and requiring less maintenance
- EEC-V technology helps ensure optimum efficiency and smooth operation
- On-Board Diagnostics (OBD II) precisely monitors all powertrain functions and exhaust emissions

| Specifications | |
|---|---|
| Type | 4-Cylinder In-line, Single Overhead Camshaft, 2V |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 2.0L |
| Horsepower (SAE net @ rpm) | 110 @ 5000 (Escort)(2)<br>110 @ 5000 (Focus) |
| Torque (lb.-ft. @ rpm) | 125 @ 3750 (Escort)(2)<br>125 @ 3750 (Focus) |
| Compression Ratio | 9.2:1 |
| Bore and Stroke (in.) | 3.34 x 3.46 |
| Main Bearings | 5 |
| Valve Tappets | Hydraulic with Roller Tappets |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded |
| Exhaust | Single, with Catalytic Converter and Flex Coupling |

(1) Under normal driving conditions with regular fluid and filter changes.

(2) Horsepower and torque ratings are based on 1999 information and are subject to change, and will be updated accordingly.

# Engines cont'd

## 2.0L DOHC 16V Zetec I-4 (Escort ZX2, Focus and Contour fleet)

The 2.0L DOHC 16V Zetec I-4 engine is standard on the Escort ZX2, Focus ZTS and ZX3, Contour fleet model, and is optional on Focus SE and SE Wagon. This engine incorporates a fine blend of performance and efficiency. A five-speed manual transaxle is standard on Contour, Focus LX, SE ZX3 and ZTS, and ZX2, while a four-speed automatic overdrive transaxle is optional on Contour, ZX2, and Focus ZX3, LX, SE and ZTS. A four-speed automatic transaxle is standard on Focus SE Wagon.

Major features and benefits:

- A cast aluminum cylinder head reduces weight and provides optimized combustion performance
- A precision cast iron cylinder block combines strength with stability
- Isolated powertrain sub-frame with elastomeric engine mounts minimizes noise, vibration and harshness (NVH) in the passenger compartment
- Sequential multi-port electronic fuel injection (SEFI) enhances the fuel delivery system by providing fuel at precisely the right moment for optimum performance
- 9.6:1 compression ratio helps ensure that the engine will run efficiently on regular unleaded fuel
- DOHC 16V design improves engine breathing and contributes to higher performance
- EEC-V electronic engine controls ensure optimum performance, and quick and easy problem diagnosis

| Specifications | |
|---|---|
| Type | 4-Cylinder, In-line Dual Overhead Camshaft, 16V |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 2.0L (121 CID) |
| Horsepower (SAE net @ rpm) | 125 @ 5500 (Contour)<br>130 @ 5750 (ZX2)<br>130 @ 5300 (Focus) |
| Torque (lb.-ft. @ rpm) | 130 @ 4000 (Contour)<br>127 @ 4250 (ZX2)<br>135 @ 4500 (Focus) |
| Compression Ratio | 9.6:1 |
| Bore and Stroke (in.) | 3.34 x 3.46 |
| Main Bearings | 5 |
| Valve Tappets | Hydraulic, Roller Bucket |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded |
| Exhaust | Single, with Catalytic Converter |

# Engines cont'd

## 2.5L DOHC 24V Duratec V-6 (Contour Sport)

The 2.5L DOHC 24V Duratec V-6 engine is standard on Contour Sport, and provides impressive horsepower and responsive low-end torque. A five-speed manual overdrive transaxle is standard on Contour, and a four-speed automatic overdrive transaxle is optional.

Major features and benefits:

- Cast aluminum cylinder head and cylinder block are lightweight, but strong
- Isolated powertrain sub-frame with elastomeric engine mounts minimizes noise, vibration and harshness (NVH) in the passenger compartment
- Sequential multi-port electronic fuel injection (SEFI) enhances the fuel delivery system by providing fuel at precisely the right moment for optimum performance
- 9.7:1 compression ratio helps ensure that the engine will run efficiently on regular unleaded fuel
- DOHC 24V design improves engine breathing and contributes to greater horsepower
- EEC-V electronic engine controls ensure optimum performance, and quick and easy problem diagnosis
- The valvetrain features self-adjusting hydraulic valve lash adjusters with roller followers and a quiet chain-driven camshaft
- Variable induction intake with dual tuned runners for each cylinder boosts low-speed torque while allowing for freer breathing at high engine speeds. This boosts engine performance across the entire operating range

| Specifications | |
|---|---|
| Type | 6-Cylinder, 60° V, Dual Overhead Camshaft, 24V |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 2.5L (155 CID) |
| Horsepower (SAE net @ rpm) | 170 @ 6250 |
| Torque (lb.-ft. @ rpm) | 165 @ 4250 |
| Compression Ratio | 9.7:1 |
| Bore and Stroke (in.) | 3.24 x 3.13 |
| Main Bearings | 4 |
| Valve Lash Adjusters | Hydraulic with Roller Followers |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded |
| Exhaust | Single, with Catalytic Converter and Flex Coupling |

# Engines cont'd

## 3.0L OHV 12V Vulcan V-6 (Taurus LX and SE)

The 3.0L OHV 12V Vulcan V-6 engine produces power without sacrificing efficiency. This engine is standard on Taurus LX and SE. An electronic four-speed automatic overdrive transaxle is also standard.

Major features and benefits:

- Cast aluminum intake manifold weighs less than conventional cast iron designs
- Sequential multi-port electronic fuel injection (SEFI) provides the precise amount of fuel at exactly the right moment for optimum performance
- Precision cast iron cylinder heads and cylinder block combine strength with stability
- 9.25:1 (9.25:1 with FFV) compression ratio helps ensure that the engine will run efficiently on regular unleaded fuel
- The valvetrain features self-adjusting hydraulic valve lash adjusters with roller followers and a quiet chain-driven camshaft
- The 60-degree V-6 engine is a naturally balanced V design that produces less vibration and smoother operation than 90-degree V-6 designs
- Center-located spark plugs maximize combustion efficiency
- Includes a long-life stainless steel exhaust system
- Revised camshaft profile with reduced overlap for improved idle stability
- Lighter weight valves for improved idle stability
- New tuned upper intake for a 10% improvement in midrange torque
- Electronic returnless fuel system for improved emissions and fuel control
- Improved overall NVH
- Water pump impeller with a new back plate to improve coolant flow and balance

| Specifications | |
|---|---|
| Type | 6-Cylinder, 60° V, Overhead Valve |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 3.0L (182 CID) |
| Horsepower (SAE net @ rpm) | 155 @ 5000 |
| Torque (lb.-ft. @ rpm) | 185 @ 4000 |
| (Taurus FFV/Gasoline) | 145 @ 5000 (Calif.)(1) |
| (Taurus FFV/E-85) | 155 @ 5000 (Calif.)(2) |
| (Taurus FFV/Gasoline) | 145 @ 5000 (49 states)(1) |
| (Taurus FFV/E-85) | 150 @ 5000 (49 states)(3) |
| Compression Ratio | 9.25:1 (9.25:1 with FFV) |
| Bore and Stroke (in.) | 3.5 x 3.1 |
| Main Bearings | 4 |
| Valve Lash Adjusters | Hydraulic |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded(4) |
| Exhaust | Single, Stainless Steel with Dual Catalytic Converter System |

(1) Torque – 170 lb.-ft. @ 3250 rpm
(2) Torque – 180 lb.-ft. @ 3500 rpm
(3) Torque – 175 lb.-ft. @ 3250 rpm
(4) Taurus FFV operates on regular unleaded fuel, E-85 or a blend of the two.

# Engines cont'd

## 3.0L DOHC 24V Duratec V-6 (Taurus LX and SE)

The 3.0L DOHC 24V Duratec V-6 engine is optional on Taurus LX and SE. This engine provides more horsepower and torque than the Vulcan V-6 engine of the same displacement. An electronic four-speed automatic overdrive transaxle is standard.

Major features and benefits:

- Cast aluminum cylinder head and cylinder block with cast iron cylinder liners are lightweight, but strong
- Isolated powertrain sub-frame with revised engine mounts with roll restrictor minimizes noise, vibration and harshness (NVH) in the passenger compartment
- Sequential multi-port electronic fuel injection (SEFI) enhances the fuel delivery system by providing fuel at precisely the right moment for optimum performance
- 10.0:1 compression ratio helps ensure that the engine will run efficiently on regular unleaded fuel
- DOHC 24V design improves engine breathing and contributes to higher performance
- EEC-V electronic engine controls ensure optimum performance, and quick and easy problem diagnosis
- The valvetrain features self-adjusting hydraulic valve lash adjusters with roller finger followers and quiet chain-driven camshafts
- Variable induction intake with dual tuned runners for each cylinder optimizes low-speed torque and high-rpm horsepower
- Composite valve covers replace aluminum for lighter weight
- Coil-on-plug ignition system to eliminate spark plug wires and provide a stronger spark to the plug for improved reliability and durability
- Composite intake manifold for lighter weight

| Specifications | |
|---|---|
| Type | 6-Cylinder, 60° V, Dual Overhead Camshaft, 24V |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 3.0L (182 CID) |
| Horsepower (SAE net @ rpm) | 200 @ 5750 |
| Torque (lb.-ft. @ rpm) | 200 @ 4500 |
| Compression Ratio | 10.0:1 |
| Bore and Stroke (in.) | 3.5 x 3.13 |
| Main Bearings | 4 |
| Valve Lash Adjusters | Hydraulic with Roller Finger Followers |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded |
| Exhaust | Single Stainless Steel with Catalyst System |

# Engines cont'd

## 3.8L OHV 12V V-6 (Mustang and Windstar)

The 3.8L OHV 12V V-6 engine combines responsive performance with fuel economy. A five-speed manual overdrive transmission is standard on Mustang, while a four-speed automatic overdrive transmission is optional on Mustang and standard on Windstar.

Major features and benefits:

- Sequential multi-port electronic fuel injection (SEFI) enhances the fuel delivery system by providing fuel at precisely the right moment for optimum performance
- Shrouded intake valves swirl air/fuel mixture for improved combustion
- Hydraulic roller valve tappets reduce valvetrain frictional losses and noise
- Piston rings are a low-tension design for reduced engine friction
- A serpentine accessory drive belt with automatic tensioner minimizes power loss
- A stainless steel and aluminum-coated stainless steel exhaust system is standard
- Features a low-restriction conical engine air cleaner to maximize intake airflow

| Specifications | |
|---|---|
| Type | 6-Cylinder, 90° V, Overhead Valve, 12V |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 3.8L (232 CID) |
| Horsepower (SAE net @ rpm) | 190 @ 5250 (Mustang)<br>200 @ 5000 (Windstar) |
| Torque (lb.-ft. @ rpm) | 220 @ 3000 (Mustang)<br>235 @ 3000 (Windstar) |
| Compression Ratio | 9.35:1 |
| Bore and Stroke (in.) | 3.80 x 3.40 |
| Main Bearings | 4 |
| Valve Tappets | Hydraulic Roller |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded |
| Exhaust | Single, Stainless Steel and Aluminum-coated Stainless Steel with Three Catalytic Converters |

# Engines cont'd

## 4.6L SOHC 16V V-8 (Crown Victoria and Mustang GT)

The 4.6L SOHC 16V V-8 engine — standard on Crown Victoria and Mustang GT — is a powerful, efficient engine equipped with sequential multi-port electronic fuel injection (SEFI), a feature that provides fuel at each cylinder port at precisely the right time. A fast-burn combustion chamber design in each cylinder produces a high compression ratio to maximize performance. This engine is coupled to the Mustang standard five-speed manual overdrive transmission or a four-speed automatic overdrive transmission, standard on Crown Victoria and optional on Mustang GT.

Major features and benefits:

- Hydraulic valve tappets and roller followers reduce valvetrain friction and noise
- Serpentine accessory drive belt system improves belt life, reduces noise and power loss
- Coil-on-plug ignition eliminates spark plug wires for improved ignition control, reduced weight and better cold starts
- Platinum-tipped spark plugs for added reliability
- Camshafts driven by steel timing chains for long-term durability

| Specifications | |
|---|---|
| Type | 8-Cylinder, 90° V, Single Overhead Camshaft, 16V |
| Engine Electronics | EEC-V Electronic Engine Controls |
| Displacement | 4.6L (281 CID) |
| Horsepower (SAE net @ rpm)(1) | 200 @ 4250 (Crown Victoria)<br>215 @ 4500 (Crown Victoria w/Dual Exhaust)<br>260 @ 4750 (Mustang GT) |
| Torque (lb.-ft. @ rpm) | 275 @ 3000 (Crown Victoria)<br>285 @ 3000 (Crown Victoria w/Dual Exhaust)<br>302 @ 4000 (Mustang GT) |
| Compression Ratio | 9:1 |
| Bore and Stroke (in.) | 3.6 x 3.6 |
| Main Bearings | 5 |
| Valve Tappets | Hydraulic with Roller Followers |
| Fuel Delivery | Sequential Multi-port Electronic Fuel Injection |
| Fuel | Regular Unleaded |
| Exhaust | Single or Dual, with Catalytic Converter(s) |

(1) Dual exhaust standard on Mustang GT (optional on Crown Victoria).

# Transmissions/Transaxles

## Five-speed Manual Overdrive Transaxle (G5M)

Introduced in 1997, this five-speed manual overdrive transaxle is available on Escort Sedan, ZX2 and Focus.

Features and benefits:

- A synchronizer in each gear acts as a clutch, speeding up or slowing down the selected gear to match the speed of the previous gear for smooth shifting
- First four gears provide optimum performance
- An overdrive fifth gear reduces engine rpm at highway speeds for improved fuel economy and quiet highway performance

## Five-speed Manual Overdrive Transaxle (MTX75)

The five-speed manual overdrive transaxle is available on Contour and Focus.

Features and benefits:

- Optimized gear ratios, including overdrive gear for fuel economy and performance
- Synchromesh on all gears including Reverse for smooth shifting
- Low-friction bearings provide exceptional efficiency and positive shift feel

## Five-speed Manual Overdrive Transmission (T50D)

The five-speed manual overdrive transmission is standard on all Mustang models.

Features and benefits:

- Designed to handle the high torque loads of the 3.8L OHV 12V V-6 and 4.6L SOHC 16V V-8 engines
- First four gears provide optimum performance
- Fifth-gear overdrive provides improved fuel economy and reduces engine wear
- The Mustang manual transmission provides a Reverse-gear brake that gradually stops the rotation of internal transmission components before shifting into Reverse. This helps reduce the chance of "grinding" gears when shifting from forward gears into Reverse

## Electronically Controlled Four-speed Automatic Overdrive Transaxle (AX4S/AX4N)

Taurus LX, SE and SE Wagons feature a four-speed automatic overdrive transaxle (AX4S/AX4N).

Features and benefits:

- A compact engine/transaxle package
- Non-synchronized gear alignment provides improved shift quality and consistency (AX4N only)
- Fully electronic shift control provides smooth shifts, adding to driver's sense of control and overall comfort
- Overdrive lowers engine rpm at highway speeds and contributes to reduced fuel use
- Engine torque control during shifts
- Electronically controlled modulated lockup torque converter in third and fourth gears for greater efficiency and improved fuel economy
- "Home-safe" mode allows limited function in second and third gears if electronic control is lost

## Electronically Controlled Four-speed Automatic Overdrive Transaxle (F4EM)

Escort Sedan and ZX2 are available with this optional four-speed automatic overdrive transaxle.

Features and benefits:

- Overdrive gear reduces engine rpm at highway speeds for improved fuel economy
- The torque converter and final drive axle provide an excellent match with engine output, providing improved performance and smoother idle
- Electronic controls and sophisticated torque converter lockup logic help ensure smooth shifting in normal driving and minimize gear hunting and frequent converter locking and unlocking on hilly terrain

# Transmissions/Transaxles cont'd

## Electronically Controlled Four-speed Automatic Overdrive Transaxle (4F27E)

Certain Focus models are available with this four-speed automatic overdrive transaxle.

Features and benefits:

- Specifically designed and developed for front-wheel-drive applications and is controlled in conjunction with the engine by the EEC-V management module
- The 4F27E transmission is an extremely compact, lightweight new design which uses an electronic synchronous shift control concept (ESSC), for the operating pressure, shift clutches, brake bands, shift schedule and converter lockup functions
- Sealed-for-life component that requires no service maintenance for normal usage
- The electronic engine controls monitor seven different transmission input functions and integrates them with 11 engine functions to determine the shift strategy to suit all driving conditions. The system provides extremely consistent and smooth shift qualities with good performance and excellent fuel economy
- The engine management module incorporates the ESSC strategy, which compensates automatically for differences in ambient temperature or altitude, to maintain the same consistent behavior under varying conditions

## Electronically Controlled Four-speed Automatic Overdrive Transaxle (CD4E)

Contour is available with the optional electronically controlled four-speed automatic overdrive transaxle (CD4E).

Features and benefits:

- A torque converter with bypass clutch for optimum efficiency
- Silent chain and planetary gear design provide quiet operation
- Overdrive lowers engine rpm at highway speeds and contributes to reduced fuel use
- Fully electronically controlled shifting matches engine performance and driver demands
- Powertrain Control Module (PCM) compensates shift points for altitude and temperature variations
- Offers 6500 rpm shift capability
- "Home-safe" mode allows limited function in second and third gears if electronic control is lost
- CD4E has a transaxle control switch (TCS) or "overdrive lockout" for use on hilly terrain and when towing a trailer

# Transmissions/Transaxles cont'd

## Electronically Controlled Four-speed Wide Ratio Automatic Overdrive Transmission (4R70W)

A wide ratio four-speed automatic overdrive transmission is standard on Crown Victoria and optional on Mustang.

Features and benefits:

- Fully electronic shift control provides a wide range of smooth shifts for optimum performance, fuel economy and sense of control
- Overdrive lowers engine rpm at highway speeds and contributes to reduced fuel use and less engine wear
- 100 percent capability to transmit torque mechanically, when converter is locked in third and fourth gears, for fuel economy gain
- Gear ratios selected for maximum utilization of engine's broad torque range; provide increased output of low-gear torque and improved start-up performance
- Use second gear for start-up on slippery roads or to give more engine braking to slow vehicle on downgrades

If certain conditions cause excessive shifting between third and fourth gears, the vehicle can be operated in Drive (D) instead of Overdrive (OD).

Such circumstances might include:

- Trailer towing
- Driving on hilly terrain
- If optional speed control fails to maintain the set speed on hills

Dr. Horace Power welcomes any questions you may have regarding engine and transmission/transaxle technology. His fax number is (248) 642-1373. Dr. Power will usually respond to your questions within 48 hours.