

## 2010 Fusion Powertrain

- 2.5-liter I-4 engine offers unsurpassed fuel economy in mid-size car non-HEV segment
- Wide range of powertrain choices available on the 2010 Fusion line, ranging from a 2.5-liter hybrid electric powertrain to 2.5L I-4 gasoline, 3.0L V6 flex-fuel, and 3.5-liter V-6 gasoline, each mated to six-speed transmissions for the first time
- Addition of six-speed transmissions along with other refinements help increase fuel economy versus current model segment leaders

A wide new range of series and content choices in the 2010 Fusion models – S, SE, SEL and Sport – is complemented by a broad array of fuel-efficient powertrain options.

“Whatever the needs of our customer, we have a 2010 Fusion ready to deliver,” said Chief Nameplate Engineer J.D. Shanahan. “Our all-new lineup of engines and six-speed transmissions delivers power with unsurpassed fuel economy.”

The Fusion S features Ford’s all-new 2.5-liter Duratec I-4 engine, which produces 175 horsepower; the Fusion SE and SEL are available with the Duratec I-4 or the upgraded 3.0-liter V-6 Duratec engine producing 240 horsepower and capable of running on Flex Fuels such as E85 ethanol; and the Fusion Sport carries a 3.5-liter V-6 pumping out 263 horsepower.

All engines are mated to six-speed transmissions. The new combinations overall help increase fuel economy by at least 17 percent on the base I4 model and approximately 10 percent with larger-displacement engines, further underlining Ford’s commitment to producing fuel-efficient powertrain systems that deliver top performance.

“Customers want it all – exhilarating performance, continuing fuel economy improvements and near-zero emissions – all for a price that offers great value,” said Barb Samardzich, vice president, Powertrain Product Development. “We intend to meet or exceed customers’ expectations as we migrate advanced technologies from shelf to showroom. The efficiency of the powerpacks that will now be available on the 2010 Fusion demonstrates that we are committed to class-leading fuel economy, no matter the segment.”

### **Upgraded engine for Fusion S**

First launched on 2009 Ford Escape, which has the best fuel economy in the small SUV segment, Ford’s Duratec 2.5-liter I-4 engine gives the 2010 Fusion S 175 horsepower and 172 pounds-feet of torque, an increase of 15 more horsepower and 16 more pounds-feet of torque than the outgoing 2.3-liter engine.

The 2.5-liter engine uses intake variable cam timing (iVCT) technology to optimize valve timing, creating a broad torque curve that helps deliver increased power along with improved efficiency. The powertrain also incorporates electronic throttle control (ETC), dual-mode crankshaft damping, new intake and exhaust manifolds and a new underbody-only catalyst, which help deliver greater fuel efficiency, more power, and lower noise, vibration, and harshness.

### **3.0-liter V-6 Duratec engine available for SE and SEL**

The improved 3.0-liter V-6 delivers 19 more horsepower and 23 more foot-pounds of torque for a total of 240 horsepower and 228 foot-pounds of torque. It is optional on the SE and SEL models. The fuel economy also improves by at least 1 mpg and 2 mpg on the highway.

The 3.0-liter features a new air induction system and ETC as well as an industry-first Cam Torque Actuated (CTA) iVCT technology that uses available camshaft torsional energy rather than pressurized oil to phase the camshafts. This allows for a smaller-displacement oil pump versus

traditional hydraulic VCT systems for improved fuel economy.

“With this technology, we are taking energy that is in your engine today – energy that was previously wasted – and using it to make an engine more efficient,” said Steve Wilkie, supervisor of Cam Drive/VCT Design. “The cam torque actuated technology is a significant player in the 3.0-liter’s ability to provide customers fuel economy and performance.”

This innovative method uses torsional energy to move the camshafts similar to the way a hydraulic ratchet works. The system takes oil from one side of the phaser and channels it to the other side, rather than draining one side and filling the other as with a traditional hydraulic system. This allows the CTA system to work more efficiently at all engine speeds and it requires a smaller oil pump, which equates to lower parasitic energy loss.

CTA reduces oil pump flow requirements by approximately 25 percent, producing a fuel economy benefit up to 0.4 percent. In addition, the CTA-based system responds more quickly than a traditional hydraulic oil actuated VCT system, improving tip-in performance feel and contributing to horsepower gains.

The 3.0-liter V-6 Duratec engine also is flex-fuel capable and can run on E85 ethanol, helping Ford deliver on a pledge made to double annual production of vehicles capable of running on renewable fuels by 2010.

### **3.5-liter V-6 powers Fusion Sport**

The award-winning 3.5-liter V-6 Duratec engine joins the Fusion lineup for 2010, powering the Sport model with 263 horsepower and 249 pounds-feet of torque. The 3.5-liter uses a compact, lightweight dual-overhead cam valvetrain for peak power and smooth operation at high RPMs.

This engine also incorporates intake variable cam timing to optimize valve timing for a smooth idle and an impressive broad torque curve with good power.

A high 10.3:1 compression ratio and aluminum cylinder heads designed for high airflow and optimized combustion help complete the package, supporting the engine’s ability to deliver great performance and fuel economy, along with low emissions. Unlike some competitive performance engines, the 3.5-liter Duratec delivers all of this without requiring premium fuel.

### **Six-speed transmissions improve performance, drivability**

The new pairing of Fusion’s engines with the 6F35-Mid automatic transmission further drives the mid-size sedan’s competitive advantage, especially when compared with the outgoing five-speed gearbox that was offered with Fusion’s I-4 models. A five-speed transmission is still the gearbox of choice for the 2.0-liter varieties offered on segment contenders Toyota Camry and Honda Accord.

When the six-speed transmission is paired with the 2.5-liter engine, for example, the Fusion powerpack delivers a 10 percent improvement in fuel efficiency along with increased power. The 3.0-liter configurations increase efficiency by 4 to 6 percent. The engine and transmission improvements combined with other vehicle systems improvements help deliver at least a 17 percent improvement on the base 2.5-liter model and approximately 10 percent on 3.0-liter equipped models.

The Ford transmission team made several specific modifications to the 6F35-Mid transmission to optimize its performance for Fusion, including using different final drive ratios for the 2.5-liter and 3.0-liter, developing an improved converter lock-up for lower operating temperatures and efficiency, recalibrating the converter clutch to accommodate a fuel-saving aggressive deceleration fuel shut-off system as well as other tweaks to diminish parasitic losses.

A SelectShift function also was added to the 3.0-liter application in response to customer requests, giving drivers the option of a fun-to-shift manual experience.

## Other Fuel Savers

The Fusion powertrain packages incorporate other advanced fuel-saving and performance technologies, including:

- **Electric Power Assisted Steering (EPAS).** The 2010 Fusion has a rack-driven EPAS system. Available on the 2.5-liter and 3.0-liter engines, energy consumption of an EPAS system is typically less than 7 percent of a conventional hydraulic rack and pinion power steering system, contributing to less fuel consumption. Ford has committed to fit up to 90 percent of its Ford, Lincoln and Mercury products with EPAS by 2012 and first introduced a column-based EPAS system on the 2008 Ford Escape and Mercury Mariner.
- **Adaptive Spark Ignition.** Included on the V-6 configurations, this system can sense what type of fuel is being injected into the motor and communicates the information to the powertrain control module (PCM), which adjusts the spark accordingly. The ignition system features two knock sensors rather than one to further improve performance. These two sensors detect the presence of uncontrolled burning in the chambers more accurately, so the control module can retard engine timing as needed to eliminate the potential for engine knock and pinging. As a result, V6 engines run equally smoothly and are able to deliver power ratings on regular unleaded fuel instead of the more expensive premium.
- **Aggressive Deceleration Fuel Shut-off.** The 3.0-liter V-6 also regulates its gas consumption by using aggressive deceleration fuel shut-off for an efficiency improvement of approximately 1 percent. When the driver releases the accelerator pedal to slow down, the system temporarily turns off the fuel. The flow of fuel seamlessly resumes when the vehicle reaches a low speed or when the driver accelerates again. The system uses the transmission to keep the engine running at a low, more efficient operating point whenever possible. This system will be added to the 2.5-liter lineup later in the 2010 model year.

In addition to improved powertrain performance, better aerodynamics and weight reductions helped deliver fuel economy gains for the 2010 Fusion.

Designers and engineers worked to optimize the airflow over, under and around the 2010 Fusion. Improvements included all-new front and rear fascias, new front and rear tire spoilers, a new underbody engine shield and overall optimization of the cooling air flow into the engine compartment.

Plus, the team eliminated 125 pounds versus the 2009 Fusion. The size of the radiator, for example, was able to be reduced in size by one-third (saving approximately pounds) with no degradation in performance. Also, 16-inch aluminum wheels helped reduce weight and aid aerodynamics while still delivering top performance.

Like everything else on the 2010 Fusion, our powertrain offerings have been improved and give our customers multiple choices to define the Fusion that is right for them,” Shanahan said.