Focus RS development car fitted with Ford's Torque Vectoring Control system is put through its paces in wintry Sweden.

New Ford C-MAX goes on sale this autumn equipped with performance enhancing technology normally associated with exotic sports cars! It's one of several new Fords to feature Torque Vectoring Control which improves grip and steering when cornering in a sporty manner or when it's wet...
Ford has long offered traction control in its cars to combat wheel-spin, particularly in slippery conditions, but the system does have one slight drawback. Traditional versions limit wheel slip by reducing engine power which is effective, but can feel frustrating, particularly for the keener driver who is "pressing on". To overcome this, Ford has developed a more sophisticated form of traction control which uses advanced brake technology to dial out wheel-spin without strangling the engine. It’s completely automatic, virtually impossible to detect and has been tested in some of the most extreme locations on the planet.

Ford engineer Derek Ward explains more: “The driver for this technology was vehicle dynamics and handling performance and it is something Ford has been looking at for nearly 10 years now. “We developed our Torque Vectoring Control system using the Focus RS and the technology is available in Fiesta, C-MAX, Grand C-MAX and will also feature in next generation Focus. This system is basically a better traction control. It uses the same sensors as normal traction control and ESP so it monitors wheel speed, steering angle, lateral acceleration and yaw. “If it detects a wheel is about to spin, the system brakes that wheel back down to the speed it should be at. It is a very gentle brake intervention. You don’t need a lot of brake torque to do it and it will only kick in when the driver is driving in a sporty manner so it’s not going to have a noticeable effect on brake wear or fuel consumption.”

In practice, the system fitted in new C-MAX is seamless. Turn into a tight right hander, floor the throttle and there’s no torque steer, no tyre squeal. Because the system nips wheel-spin in the bud, it not only increases traction in the direction of travel, it also restores the guiding
Torque Vectoring Control

Force or steering ability of the inside tyre which helps reduce the chance of understeer.
Ford’s Torque Vectoring Control system can also potentially reduce front tyre wear too. It all adds up to a safer, more enjoyable driving experience.

“The system is especially good at keeping a vehicle on a path while still allowing the driver to continue to accelerate,” adds Ward. “He or she won’t know what is happening, but they’ll be very pleased they can drive in a sporty manner and the vehicle will accurately follow their steering inputs.”

Torque vectoring control allows the driver to enjoy the performance of powerful front wheel drive vehicles in a safe and rewarding manner, but the system has many benefits when fitted to cars with smaller engines as well.

“It helps support vehicle stability in all applications. We like to think of it as a safety feature and performance aid,” says Ward. “Admittedly on dry asphalt you are not going to get the inside wheel on a 1.4-litre Fiesta spinning up often but on a wet road or an icy road you might.

“All of the people who have sampled it have noticed a significant improvement in grip and handling levels and it definitely helps in icy conditions. We’ve tested the system on frozen lakes in Sweden and extensively at our test facility, Lommel in Belgium.

“This is cutting edge technology, it works and it’s of real benefit to customers. You could use a system like this as a sticking plaster to improve a vehicle with compromised driving dynamics. Our philosophy however is to make excellent base vehicles and then add this system on top to make them even better!”

Meet Derek Ward...

Derek Ward joined Ford in 2002 after graduating from University with a Masters in Mechanical Engineering. Born in New Zealand, he moved to Germany in 1997, is currently attached to Ford’s Research and Advanced Engineering department and is based in Merkenich.

Derek specialises in active drive-line technologies and played a key role in developing the AWD system in Ford Kuga. He spends at least one day a week behind the wheel testing.

“My job is very satisfying,” he says. “It’s really rewarding seeing something you’ve developed from scratch feature in a production car, but probably the bit I enjoy most about work is getting behind the wheel and test driving, sometimes in extreme locations.

“I spend a few weeks each year at our test site in Arctic Sweden driving cars on frozen lakes, fine-tuning advanced all wheel drive systems and so on. The worst part of the job is the paperwork, but that’s probably the same with any job. We’re lucky to work with such exciting vehicles and systems.

Derek owns an Electric Orange Focus ST which he rates highly. His dream drive would be a Focus RS AWD with at least 350PS, failing that a Focus RS World Rally Car.

So what does he get up to away from work? “When I have holidays I tend to spend time in New Zealand visiting family (and escaping the German winter), so I do water skiing, that sort of thing. Other than that I like driving and spending time with my girlfriend!”
TECHNOLOGY FOR EFFICIENCY

EcoMode

How we drive our cars can have a huge impact on fuel consumption so Ford has developed technology that helps motorists get more from a tank-full by fine-tuning their driving style. This eco-friendly feature really does pay dividends at the pumps and it’s fun to use as well...

Ford cars and commercial vehicles are engineered to deliver impressive fuel economy in all driving conditions but ultimately driving style will determine just how much or little fuel a vehicle consumes.

Overzealous use of the right foot will result in more frequent trips to the pumps. But keeping speed down, driving smoothly, and changing gear early will help to minimize fuel consumption and reduce harmful CO2 emissions.

To try and encourage motorists to drive more efficiently, Ford now offers an EcoMode feature on several of its products. Launched on Focus ECOnetic and now available on new Mondeo, (S-MAX and Galaxy introduction later this year), this driver-friendly device analyses how the vehicle is being driven and gives the driver tips on how to make each litre last longer.

Ford engineer and EcoMode expert Thomas Schick explains: “The idea behind EcoMode was to make people more aware of how their driving style can influence fuel use. Economical driving isn’t rocket science. If I drive my car carefully I can achieve 40mpg but if I really put my foot down it can drop to 20mpg. It mainly depends on how much power I use. It’s the same as riding a bike. Doing 30kph instead of 20kph or using the wrong gear doesn’t work well. You have to work a lot harder, you sweat more. But you don’t have to teach someone that, they can feel it. “Customers though expect a car to be fuel efficient independent of the way they drive. They feel that the laws of physics no longer apply – of course they do!”

**HOW IT WORKS ...**

EcoMode is a software based feature which uses algorithms developed from a data base of ‘eco-driving’ techniques to help motorists achieve maximum real world fuel economy.

The system is incorporated in the car’s instrument cluster within the trip computer menu. It monitors parameters such as vehicle speed, engine rpm, engine torque and engine temperatures, the clutch position, accelerator position and gear lever position. It even calculates the percentage of cold-engine short trips made.

When EcoMode is accessed, three flower icons with five petals show up in the instrument cluster. The first flower represents gear shifting behaviour, the second flower represents driver anticipation or how smoothly the vehicle is being driven, and the third and final flower represents speed. If you drive economically, you are rewarded with illuminated petals on the flowers. The more efficiently you drive, the more petals you light up.

“In addition to the petal, the system will flash messages up such as early shifting saves fuel, or smooth driving saves fuel,” adds Schick. “This helps the driver to adjust his or her driving style accordingly if they have lost petals.

“Using the highest drivable gear appropriate will improve economy so will adjusting your speed and distance to other vehicles to avoid unnecessary braking and acceleration. Higher speeds also use more fuel as do short trips. For this reason the system monitors the engine temperature to see how long it takes for the car’s engine to warm up properly. The system will then advise the driver what percentage of their driving is done on short trips.”

EcoMode scores driving performance on a cumulative basis but the system can be zeroed by resetting the average fuel consumption trip. When EcoMode is accessed, three flower icons with five petals show up in the instrument cluster. The first flower represents gear shifting behaviour, the second flower represents driver anticipation or how smoothly the vehicle is being driven, and the third and final flower represents speed. If you drive economically, you are rewarded with illuminated petals on the flowers. The more efficiently you drive, the more petals you light up.

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**POTENTIAL SAVINGS ...**

So far customer feedback has been very positive and the press reaction to EcoMode has been excellent. So just how much difference can EcoMode make to fuel consumption?

“The potential is significant,” adds Schick. “Ford now offers ECO drive training in certain European markets and some participants have shown improvements of up to 40%. Statistically though we assume that most people can achieve at least 5% improvements. The driver has more potential to affect fuel consumption than any technology so coaching the driver really makes sense. Achieving fuel consumption savings of 20% through new technology is a major challenge. Taking the full advantage of that potential requires the right mindset behind the wheel.

“EcoMode is not a game but it can be very rewarding to achieve a high score. If people want to use it to improve their driving style they can. If people believe they are driving well anyway, they always have a reference.”
Did you know …
That Ford cars now come equipped with the company’s Easy Fuel system which prevents drivers from filling up with the wrong type of fuel! This driver-friendly feature made its debut on Ford Mondeo in 2007 has saved thousands of motorists from costly repair bills.

Accidental mis-fuelling can severely damage latest generation diesel engines but Ford’s Easy Fuel system prevents this thanks to a clever device called a mis-fuelling inhibitor.

At the entrance to the fuel pipe is a sealed filler pipe insert and fuel nozzle locator that guides the nozzle to the tank opening. The insert contains a mechanically operated diameter detector which only allows larger diesel fuel nozzles to be inserted into the filler pipe, not the thinner petrol nozzles. Unlike a petrol engine, which compresses a mixture of gasoline and air, diesel engines compress just air before diesel fuel is injected into the cylinder and the fuel is ignited. Pouring gasoline into a diesel engine can cause damage to the fuel pump, the high-pressure injection system, as well as trigger other serious engine problems and four-figure repair costs.