New Ford Fiesta in detail

1. Fiesta global development

- **Single vehicle developed for customers globally**
- **'One Ford' Global Product Development System and cooperation, including Mazda**
- **First Ford car to be developed using this process, with others to follow**

"The new Ford Fiesta will set the standard for delivering products that our customers really want and value while taking advantage of our wonderful global resources. With momentum in small-car sales outpacing industry growth worldwide, we will build on our European small car strength to deliver a new generation of small cars for a new generation of highly discerning customers."

Alan Mulally, President and CEO, Ford Motor Company

From the outset, the new Ford Fiesta has been designed and developed to meet the differing needs of customers around the world, from Western and Eastern Europe to North America, China, Australia and South Africa.

At first glance, such a global population may not have much in common, so Ford carried out extensive research on customer needs, wants and desires around the world when planning its new small car – long before the creation of the Verve Concept preview vehicle and the subsequent production version of new Fiesta.

The result is not just a new car, but a new process, which dictates the future of Ford product development and through which other Ford cars will be born. New Fiesta is the first product of Ford Motor Company CEO, Alan Mulally's 'One Ford' vision of a single, global company designing and building cars for a single, global customer base, not divided by regional or national borders.

Following its worldwide debut at the 2008 Geneva Motor Show, new Fiesta will be on sale across Europe in late 2008 and in Australia in early 2009. By 2010, new Fiesta will also be on sale in markets across Asia, South Africa and North America, in a variety of regionally tailored models, derived from a common platform.

Developing such a vehicle needs a process owner. For Ford, that was Marin Burela, the company's Executive Director of Small Cars and now Ford Australia's President & CEO, who accepted the responsibility for developing new Fiesta for the world.

"It's an incredibly exciting project," says Burela. "New Fiesta is a landmark moment for Ford. It's our most significant global vehicle project since the Model T and heralds the future for Ford product development."

Shared wants – local needs

Several years before the world saw the exciting Verve Concept, Ford had been engaged in extensive research in Asia Pacific, China, Europe and North America to understand customer needs and desires around the world and assess the suitability for a global car project.

When Ford was considering the attitudes of a worldwide customer base, it looked outside the automotive industry, to the experiences of premium electronics and jewellery brands, to understand how and where the same product appeals across borders. The immediate conclusion was that Ford's European cars were a great fit for a generation that has grown up with the internet and mobile phones as necessities, not luxuries; a generation which believes that bigger isn't necessarily better and that technology rules.

Burela explains: "One lesson we understood very early on was that the world is getting smaller for products such as cars and that tastes are converging, driven by two key factors. Firstly, ten years ago customers in Asia Pacific markets such as China would not have had the option to buy anything other than a locally produced vehicle; that has changed and China today is fastest-growing big economy in the world, with sophisticated tastes and many more customers there able to afford the car of their choice.

"Secondly, in that same ten-year period, we've seen a huge shift in demand in major developed markets, such as the United States. The best selling vehicle there is no longer a truck – it's a car, and an imported vehicle at that. The unstable macro-economic climate driving fuel and raw materials prices has coupled with consumer concern over environmental issues to create a significant increase in demand for smaller, more efficient cars.

"Combined, these phenomena create a significant opportunity for a global small car that didn't exist ten – or even five – years ago."

Researching in these changing and demanding times, Ford found a significant commonality in the importance of design. Whether customers were in Nanjing, Detroit or Cologne, style was at the top of the wants list.

“Style is king,” explains Burela. “So in designing the Verve Concept – and ultimately the new Fiesta – it was a matter of judging the subtle differences in style preferences, rather than adjusting to completely separate treatments. The initial reception to the three Verve Concept vehicles said it all – the core design worked for everyone.”

“The Verve Concept project was a proof point for us, in design terms,” adds Martin Smith, Executive Director of Design for Ford of Europe, creator of Ford of Europe’s signature kinetic design. “Future trends in design and style will increasingly be influenced by Asia and there is an increasing appetite there for Western designs – what’s cool in London is also cool in Beijing. We showed how interpretation of a strong signature design theme can work universally yet be tailored in details for local tastes.”

With an identified market for a global small car, Ford’s attention turned towards the feasibility of producing a car on a global basis. Here, Ford used lessons of past developments and collaborations.

“Previous attempts at creating a global Ford car were about adapting one region’s product for another, retrospectively,” says Marin Burela. “Before, it was about fitting the customers to the car, rather than the car to the customers. Our challenge was to create an entirely new process, one that required us to do things differently and collaborate on a different level, not separated by regional requirements.”

A business case was established for a production car, but this case was not based on a global sales figure. Ford did not set one, instead creating a detailed development process and a flexible manufacturing system to ensure the company could react quickly to customer demand.

Such a process also ensured that quality procedures could be replicated in manufacturing locations around the world, essential in creating a common new Fiesta production quality.

Global Product Development System

New Fiesta is the first global Ford product developed using key methodologies from the new Ford Global Product Development System (GPDS).

GPDS uses the latest in digital design, engineering and manufacturing technologies to bring products to market from the drawing board quicker than ever. It also facilitates high levels of manufacturing flexibility and product differentiation between different brands based on a common platform. This was essential in allowing Ford and Mazda to work together efficiently to share the core, yet invisible base architecture for their individual small cars.

“GPDS is essentially an extension of previous product development collaboration within the Ford family,” explains Burela. “For example, the latest European Focus shares technologies and certain components and architectures with the Volvo S40/V50 and the Mazda3.”

For small cars, Ford and Mazda engineers collaborated closely on key engineering elements of a new architecture, bringing together the best of their respective areas of expertise. The approach delivered a strong foundation that would enable the two brands to design individual vehicles and customise the attributes of their respective products, choosing from an array of technologies that can be tuned to provide specific customer benefits.

“We undertook a complete CAE (Computer Aided Engineering) assessment at the attribute level and conducted two events to virtual-build the new car completely in the digital environment,” says Dieter Schwarz, Vehicle Engineering Manager for new Fiesta globally. “This helped us identify any manufacturing issues very early in the development process, and that made a huge difference when we started actual production. Our first test-build on the production line had very few issues and the second one sailed through.”

Global range unveiled

The unveiling of new Fiesta production cars around the world shows how the application of kinetic design can be adapted to meet local market tastes. The new Fiesta reveal at the Beijing Auto Show in April 2008 showed the minor differences in exterior design between the European and Asian versions.

The same will be true of the way they drive. Whether it is a new Fiesta built in Cologne, Germany, or Nanjing, China, it will have the same chassis architecture. However, in Ford’s global engineering approach, new Fiestas around the world will be tuned to suit regional driving conditions and customer preferences.

“For all their similarities in style and design, there remain some fundamental differences in customer tastes around the world – and this is most apparent in vehicle dynamics tuning,” Dieter Schwarz explains. “Some markets, such as Europe, have a bias toward handling. Others, like Asia, tend to prioritise ride comfort. Regardless of which country you drive new Fiesta in, the car will have the right characteristics for its surroundings.”

For example, new Fiesta’s shared independent MacPherson front suspension and a twist-beam rear suspension has been adapted with honed bushings, spring and damper rates for different regions. European Fiesta models will have a thicker diameter, stiffer torsion bar in the rear suspension, a feature designed to deliver that trademark Fiesta handling prowess on twisting roads.

Lessons learned with new Fiesta will be very important to Ford’s future. The new Fiesta range will be the first of Ford’s global car family.

“We’ve made it clear this is just the beginning,” says Marin Burela. “A new global car range will follow our small car range, but with a much shorter time between regional models being unveiled and launched. This is the future.”

2. Fiesta exterior design

- **First small Ford car to be created using kinetic design form language**
- **Dynamic and distinctive – the most dramatic Fiesta ever**
- **Brings acclaimed Verve Concept design to production reality**

"The striking Verve Concept was the first indication of how kinetic design could be applied to a small car and it sparked many questions, the most common being 'Can you really build that concept?' To me, new Fiesta answers this question with a resounding 'Yes'. It is Verve realised, not compromised."

Martin Smith, Executive Director of Design, Ford of Europe

Building on the exciting momentum of Ford's distinctive iosis and iosis X concept cars and the premium feel of latest-generation production models like the new Mondeo and Focus, the all-new Ford Fiesta is the latest application of the company's kinetic design philosophy, bringing the modern Ford of Europe family style to the small car segment.

Bold graphics

Since the iosis concept vehicle introduced kinetic design in 2005, each new Ford has been created in a new interpretation of this form language, translating the trademark bold graphic elements and proportions to create a family of distinctive models.

Ford of Europe's Executive Director of Design, Martin Smith, uses expressions like 'precision sculpted', 'agile muscularity' and 'toned athleticism' to describe the Ford design philosophy that has now created new Fiesta.

However, this does not mean a 'one size fits all' approach. Martin Smith explains: "Kinetic design is not just a matter of 'cut and paste' from one vehicle to the next; each is a new interpretation of the fundamental design elements. A kinetic small car can emphasise different elements of the form language to a larger car, and to different degrees."

The result is a new Fiesta that joins a family of vehicles immediately identifiable as new generation Fords, yet with distinctive character to appeal to their target audiences. New Fiesta asserts its own air of confidence, stylishness and individuality.

"We have a kinetic family look now – each individual, yet instantly identifiable as part of the new generation of Ford vehicles," explains Smith.

From concept to reality

For new Fiesta, the challenge for Smith and his team was to reflect the acknowledged character and driving dynamics that this popular small car has always represented, while reinvigorating the Fiesta brand to attract a

whole new generation of customers, many of them new to Ford and new to Fiesta. Along with this, the team had to ensure that new Fiesta was undeniably a modern Ford.

The predominately young target audience was defined early on by the design team as 'Design Progressives' – a group that immediately identified with the kinetic design philosophy of 'energy in motion'.

Early in the design process, the design team showed different design concepts to groups of these customers, translating the favoured treatment into the original Verve Concept, later revealed at auto shows around the world.

From the outset, the Verve Concept was created with an eye toward production. Through this process, new Fiesta customers are clearly able to see the strong visual relationship between the concept car that excited them and the production car created from it.

A small Ford for a new generation

From front to rear, the all-new Fiesta exudes presence and individuality.

It wears the distinctive, bold Ford 'face'. Most noticeably, it uses the signature, large, inverted trapezoidal lower grille and large, centred Ford oval badge that characterises both the Verve Concept and other modern Ford family vehicles.

Chrome and brightwork are used selectively, like jewellery accents, to convey elegance and sophistication. The lower grille features this effect with its clean, precise chrome surround.

The grille is finished with a bisecting, horizontal number plate bar and framed by a dynamic-looking front structure, sculpted as if a pair of 'toned muscles' were located on either side of the bonnet.

The application of such a strong face creates recognition and communicates an attitude that is bold and sporty, yet friendly and engaging.

"We focused on bringing more emotion and character into Fiesta and to make the car appear larger and more athletic than the previous model, even though it remains the same size," explains Stefan Lamm, Chief Exterior Designer, Ford of Europe. "The grille is one of the main elements in achieving this, by drawing attention to the front of the car."

Moving rearwards, sleek, wraparound headlamps sweep back sharply, making both a strong visual statement as well as allowing for a very short shut-line to the sculpted, clamshell bonnet. This treatment gives new Fiesta a friendly, open and inviting personality, and in turn helps fulfil the requirements of pedestrian protection.

Strong brand character elements feature along the side of the vehicle, with bold, pronounced wheel arch lips – now a key feature of the Ford brand DNA and present across the portfolio of models. These communicate tension and muscularity, signature elements of kinetic design.

Above the wheel lips is a rising bodyside beltline, a strong dynamic line sweeping along the side of the car towards the high rear light cluster. This maintains the 'wedge' attitude admired on the Verve Concept and communicates robustness. The undercut panel running beneath this line adds strength and tension, while the door handles are carefully integrated, for a tidy, harmonious finish.

A sloping A-pillar extends forward towards the front wheel centre line to shorten visually the overhang, while an A-pillar window adds to the sporty look and aids visibility.

New Fiesta retains the sweeping profile and treatment of the glass area – or Day Light Opening (DLO) – of the Verve Concept. This acts as a visual reinforcement of apparent movement that does much to emphasise the car's sporty character. Side windows combine neatly to create a unified side window graphic – another kinetic design element that communicates dynamism.

The upper arc of this window shape forms a feature line that incorporates the shapes of the tail lamps and rear spoiler into a coherent signature, while an elegant chrome accent on Zetec models frames the lower edge of the side glass and accentuates the established Ford 'kick-up' at the lower rear corner.

At the same time, the sweeping roofline extends back appealingly from the forward-stretching A-pillar, framing the bold graphic of the Fiesta side window profile just as on the Verve Concept.

This design approach is applied to both three-door and five-door models, retaining a dramatic and dynamic profile without sacrificing the true family car package.

"We took the five-door design as seriously as the three-door," says Stefan Lamm. "Both cars are based on the same body, which makes the five-door particularly sporty and dynamic, almost like a five-door coupé."

At the rear of the car, many kinetic elements combine, including the chamfered rear glass area, low roofline sweeping into a small spoiler, the distinctive licence plate graphic and dramatic tail lamps with honeycomb detailing, positioned high on Fiesta's rear corners. Smith believes this combination is "the most distinctive aspect of the vehicle".

An integrated, dark grey lower diffuser insert accentuates the bumper shape and adds to the athletic stance of new Fiesta. The diffuser lends an air of lightness to the rear shape while its lines stretching outward toward the bumper lip draw the eyes once again to the wheels and Fiesta's sporty stance.

It would be easy to overlook such subtle elements were they not designed to be enhanced through colour. There are 11 exterior colours available in Australia.

3. Fiesta interior design

- **Dramatic interior styling matches kinetic exterior**
- **Full surfaces and sculpted shapes offset by contrasting colours, including two-colour instrument panel**
- **Quality detailing, inspired by premium, high-tech products**

"New Fiesta is a quantum leap in bringing kinetic design elements into interior design. This type of visual innovation – linking the form language of the interior so strongly with the exterior – is something we believe no other company is doing."

Niko Vidakovic, Chief Interior Designer, Ford of Europe

Creating a striking, kinetic exterior shape was just one part of the new Fiesta design story and the Verve Concept that preceded it. New Fiesta is as dramatic on the inside as it is on the outside, with courageous use of dynamic lines, full surfaces and bold graphics.

Boldly shaped surfaces and contrasting colours and materials feature in an enveloping dashboard design that wraps around the driver and passenger and creates individual space. Through the application of carefully developed and matched colours and trims, new Fiesta's interior meets a full spectrum of customer desires, from a playful sense of fashion to mature sophistication.

"It's a warm, inviting cabin," explains Niko Vidakovic, Chief Interior Designer, Ford of Europe. "We've taken great care to ensure that this overall feel is maintained across the new Fiesta range, but differentiated by the use of a range of colours and trim materials."

Designed for the times

For inspiration, new Fiesta's Design team studied extensively the styling and use of luxury goods and consumer electronics to create the look and feel for new Fiesta's cabin and main controls.

From the driver's seat, the eye is drawn immediately to new Fiesta's striking instrument panel centre stack. Designed for a global population familiar with the design language and intuitive operation of mobile phones and personal music players, new Fiesta's centre stack houses the car's Human Machine Interface (HMI), linked to a multi-function display screen in a high-mounted binnacle, close to the driver's field of vision.

Functionally, a key element of the design is the decoupling of the traditional in-car entertainment system elements – screen, controls and electronics – something only made possible by development of underlying technologies. Separating these elements allowed designers to place controls and buttons for optimal ergonomic positioning in a design that resembles the usage logic of a modern mobile phone.

“Cars in the past featured a ‘big brick’ audio head unit, which created vertical surfaces,” explains Vidakovic. “In new Fiesta, the only visible part of the underlying electronics is the CD slot. The buttons and the multi-function displays are separated from the electronic control unit and this is far less constraining on design freedom.”

As a result, every button and switch on the HMI has been crafted with the minute attention to detail that characterises good portable electronic designs. New Fiesta introduces a new approach to form and function and the instrument panel centre stack looks and feels very different to traditional automotive switchgear.

Echoing this theme are the stylish rotary controls for heating and air-conditioning that sit at the base of the centre stack, styled to reflect the look and feel of high-end power shower controls.

“Simple touches can radiate a feeling of quality,” says Vidakovic. “These are critical touch points in the cabin, for both driver and passenger and creating a sensation of class through their styling and movement was essential.”

Precision and confidence

Surrounding the centre stack are several defining interior elements that tell you immediately this must be a new Ford – with every one of these elements designed to reflect the character of the vehicle.

“Most important is the steering wheel,” highlights Vidakovic. “It’s the core interaction between driver and vehicle and carries a size and feel that communicates new Fiesta’s sportiness and confident driving quality.”

The wheel has a modern, sculpted feel, using bright accents on its spokes to create a futuristic look. This is reinforced by the view through the wheel to the precision primary instruments and controls. The primary display – speedometer and rev counter – are framed by binocular-shaped, short tunnels of brightwork, which complement the centre stack and contrast the interior colours in another example of expressive design.

The attention to detail includes elements such as the new control stalks on the steering column, created to be precise and delightful to use. Again, the design team sought inspiration outside the automotive world and here it was provided by the packaging of luxury cosmetics, which often incorporate sophisticated, quality detailing to convey brand appeal. The column stalks use weight and precise action to communicate quality and responsiveness.

Quality is further evident in many details throughout new Fiesta’s interior, including such touches as the stitching on leather seats, the texture of cloth seats and playful ‘Y’ graphic on the seat facings.

Colours make the mood

As with the exterior, colours play as vital a role as shape in defining and establishing the character and attitude of the different new Fiesta models.

In total, there are three distinct series options – CL, LX and Zetec – and four different colour and trim combinations for the interior.

Each option features a two-colour instrument panel, with differing contrasts toned to match the palette of the exterior.

The blend of colours is designed to be harmonious and was inspired by the exclusive fabrics and leathers of haute couture, according to Ruth Pauli, Chief Designer, Colours and Trims, Ford of Europe.

“Colour plays an important role in making an emotional contact with customers,” Pauli explains. “With new Fiesta, we have selected expressive colours in the right harmonies and contrasts, together with quality materials like glove-leather that’s beautiful to touch. These details bring a feeling of ‘premium-ness’ into a volume small car.”

The use of colour and kinetic design elements allowed the design team to create more contemporary interpretations and to incorporate new considerations, such as street fashion, into other models in the range. For example:

- The **CL and LX** series takes their inspiration from designer clothing and bespoke suits to emphasise a contemporary feel
- The modern **Zetec** model employs a Soho Burgundy red colour, with dark gloss, high contrast finishes for a sleek, technical appearance, inspired by premium technology brands

For the Zetec model, an Aesthetic Lighting Pack enhances the use of colour even further. In this premium, big-car feature a dome light comprising two small LEDs – situated in the overhead courtesy lamp – illuminates the centre console and gearshift area in a soft red glow.

A second ambient LED light source within the dash panel above the glove box emits a complementary soft red light on the passenger side of the car.

When the doors are opened, ambient lights brighten and are matched with footwell courtesy lighting. Even the centre console has an internal red LED illumination when opened that reflects premium electronic devices.

Martin Smith concludes: “This is designed to be the most complete, expressive and exciting Fiesta Ford has ever produced, inside and out. To me, it is a car that evokes an instant emotional response – ‘I want one’ – before you even get near it.”

4. Fiesta driving quality

- **New Fiesta driving quality blends sporty, confident handling and sophisticated ride**
- **Stiffer body structure and reduced vehicle weight delivers 'light-yet-solid' feel**
- **Specially tuned Electric Power Assist Steering provides low-speed steering ease with more direct driver feedback at higher speeds**
- **Vehicle dynamics engineered and tuned for regional differences in customer demands**
- **Setting new standards for small car NVH performance**

"With its bold and energetic design, the new Ford Fiesta clearly communicates that it is going to be a great driver's car. Behind the wheel, it delivers on that promise, extending the traditional Fiesta strengths of great vehicle dynamics and driving quality for a new generation."

Norbert Kessing, Vehicle Dynamics Manager, Ford of Europe

Buying a Fiesta has always meant owning a great car to drive, with impressive vehicle dynamics in a small car package. The new Ford Fiesta is set to extend that reputation even further, thanks to a number of key changes.

Being the first product of Ford Motor Company's new global product development process, this latest generation Fiesta will introduce Europe's familiar small car to customers around the world. It will also introduce these customers to Ford of Europe's excellence in chassis development and attention to detail in vehicle handling and drive comfort.

"Driving the new Fiesta is going to be a very pleasant surprise," says Dieter Schwarz, Vehicle Engineering Manager for global Fiesta development, whose engineering teams used the Fiesta's robust structure to deliver an even more engaging driving experience. "The handling is nimble, yet the car feels solid and reassuring."

Lean, green steering system

A key factor in the light, nimble handling of new Fiesta is a new feature – the first application of full Electric Power Assist Steering (EPAS) on a European Ford.

EPAS replaces the traditional hydraulic power-assist system of the previous-generation Fiesta, which required higher effort in low speed manoeuvres like parking and urban driving.

EPAS also delivers a noticeable reduction in real world fuel consumption by operating only when steering assistance is required and deactivating when not, thereby reducing the power it consumes from the engine and the fuel it requires. This compares favourably to a traditional hydraulic pump, which operates continuously once the car's ignition is engaged.

Ford's driving dynamics experts were aware that some EPAS systems compromise steering feel. Consequently, they devoted extensive effort to detailed tuning of new Fiesta's EPAS system to ensure that it delivers the precise steering feedback expected from a Ford vehicle.

"We had three core objectives in tuning the steering system," explains Norbert Kessing. "It should improve fuel consumption and CO_2 emissions; it should feel as natural as possible and familiar to our customers; and disturbance sensitivity – such as kickback from poor road surfaces – should be improved versus the previous car."

A key engineering challenge was to develop the new Fiesta EPAS system to reduce fuel consumption and CO_2 emissions while maintaining Fiesta's traditionally excellent feedback to the driver in higher-speed, handling situations. Here, extensive work was undertaken to achieve a fine, almost imperceptible transition between levels of assist and direct feedback from the road.

Much of the development time was dedicated to this intensive fine tuning of the EPAS system, on every type of road, from narrow city streets to twisty country roads. In total, steering development engineers accumulated over 50,000 kilometres of on-road testing. This work was supported by Ford engineers' experience of the Electric Hydraulic Power Assist Steering (EHPAS) system developed for the Ford C-MAX and Focus.

"Optimisation work for the steering was not isolated to the steering components," explains Kessing. "The whole vehicle has to be optimised to react correctly to the steering system."

Much of this work was done before prototypes even took to the road. Detailed steering optimisation took place with Computer Aided Engineering (CAE) calculations, simulations, steering rig tests and prototype vehicle tests, months before real world assessment and prove-out. Fine tuning was conducted subjectively in the vehicle, supported by CAE and simulation analysis. Overall, the CAE input to new Fiesta saved 20 percent in vehicle dynamics development time, compared to previous vehicles.

The result is a unique EPAS system. Sophisticated speed mapping allows light steering at parking speeds and firmer steering at higher speeds, making new Fiesta feel natural, confident and easy to position on the road.

This is applied by using a vehicle speed sensor, which identifies the turning rate and angle of steering to determine the level of assistance offered. This helpful feature has then been tuned further by the engineering team for different powertrain options, due to the different weight loads put on the steering.

New Fiesta's steering ratio has also improved over the outgoing car from 15:1 to 14.25:1, which creates a more responsive and direct feel and a tight 10.2 metre turning circle, perfect for manoeuvring in tight spaces.

EPAS also features an additional pull-drift compensation, which helps cope with changes in road camber for easier driving. The pull-drift system continuously monitors the steering state and position of front wheels,

controlling drift automatically by making continuous, imperceptible adjustments to the force on the steering wheel.

“We wanted new Fiesta to have excellent steering precision,” Dieter Schwarz says. “It took a detailed and uncompromising approach, and I am confident that we have actually exceeded our objectives.”

Global architecture – local understanding

Whether it is a new Fiesta built in Cologne, Germany; Valencia, Spain; or Nanjing, China, it will have the same chassis architecture. However, in Ford’s global engineering approach, new Fiestas around the world will be configured and tuned to suit regional driving conditions and customer preferences.

“For all their similarities in style and design, there remain some fundamental differences in customer tastes around the world – and this is most apparent in vehicle dynamics tuning,” Schwarz explains. “Some markets, such as Europe, have a bias toward handling. Others, like Asia, tend to prioritise ride comfort. Regardless of which continent you drive new Fiesta on, the car will have the right characteristics for its surroundings.”

The key to delivering this was early engagement in research to understand fully the customer priorities and wishes in different markets. The engineering approach was to create a solid, proven base chassis architecture that would be appropriate for a range of different markets, yet readily tuned and adapted for regional differences.

Consequently, new Fiesta features the proven, independent MacPherson front suspension and a twist-beam rear suspension, refined and updated for the new car.

New Fiesta’s rear suspension twist beam diameter has increased by 28 percent versus the previous-generation Fiesta, while the front suspension anti-roll bar diameter has increased to 22mm, from 19mm in the previous model. Ford engineers have also honed bushings, spring and damper rates – with these also set to be tailored for different regions.

European Fiesta models, for example, will feature a thicker diameter, stiffer torsion bar in the rear suspension and designed to deliver that trademark Fiesta handling prowess on twisting roads.

At the same time, impact harshness reductions were a major target for Ford engineers. One significant example is the twist-beam pivot bush, which has been increased in size to soak up impact harshness.

The new twist-beam pivot bush uses a larger, more sophisticated design, with different rubber compounds for optimal performance, not only in static stiffness and comfort, but also dynamic performance such as steering precision and handling. It can also be tuned more readily for different markets, to absorb bumps and road harshness on poor surfaces. While slightly heavier in weight, this was considered an essential addition in a no-compromise global new Fiesta.

Much of the initial regional development work has been done in Europe, by replicating different types of roads and surfaces from around the world. More detailed work also took place in each of the regions in which new Fiesta will be sold.

Responsive handling – sophisticated ride

Depending on the road conditions and the mood of the driver, new Fiesta offers a combination of sporty and dynamic handling, a sophisticated and mature cruising ability and an effortless performance in urban driving.

"It was very important that new Fiesta would deliver the superior driving capabilities expected from a Ford vehicle, whether in the city or on twisty country roads and at a range of speeds," says Norbert Kessing. "Our aim was to create a driving environment where the driver will always feel comfortable and in full control."

To enhance the controlled driving environment, Ford engineers also refined Ford's Dynamic Stability Control (DSC) for new Fiesta, which is standard on Zetec and is available as an option on CL and LX.

The Fiesta DSC system has been developed to reinforce new Fiesta's sporty driving characteristics. It is designed to be non-intrusive during spirited driving but to provide crucial protection should the situation require it, something which required careful, detailed development work.

"It's easy to make a car safe with DSC, but if you want to make the car engaging and agile as well, then that takes a lot of attention to detail. We're proud of what we've achieved with new Fiesta," says Kessing.

Significantly reduced noise

New Fiesta looks more sophisticated inside and out, and its driving refinement echoes that visual sophistication. It is set to raise the standard for small cars with its improved road, powertrain and wind noise isolation.

Noise, Vibration and Harshness (NVH) is known within Ford as 'Sound Quality and Vibration' (SQ&V) and the focus is on improving sound quality and minimising unwanted noise transmission for all vehicle occupants. As Kessing explains, "This is not about numbing the senses, it's more about creating a pleasurable driving environment."

New Fiesta's SQ&V team worked closely with the design team from the outset, to eliminate any physical aspects that could lead to noise intrusion into the cabin.

One of the key areas of co-operation between the two teams was wind noise. To ensure wind noise was reduced to an absolute minimum inside new Fiesta's cabin, all potential wind noise sources were assessed at the component level first and then at the vehicle level. This allowed areas of potential weakness to be corrected even before the first prototype was built.

Three-dimensional software tools were used in developing new Fiesta's body structure. The use of these advanced digital engineering tools allowed SQ&V engineers to evaluate the whole car structure and identify easily and rectify any potential noise, vibration, or harshness transmission. This process also allowed SQ&V engineers to view the latest development levels of components in real time, thereby quickening the pace of overall development and allowing far more time for tuning and optimisation.

This up-front work helped ensure that traditional NVH sound package elements, like seals, fitted correctly from the outset – even on the very first prototypes. Consequently, new Fiesta's sealing system is improved significantly and is expected to be best-in-class for overall performance.

Key contributors to this quiet and refined performance are double door seals to isolate road noise and fully encapsulated glass.

Transmission of powertrain noise throughout the new Fiesta's body structure has also been reduced by improved sound absorption, body structure improvements and a secondary bulkhead that reduces noise in the cabin.

"We wanted to make sure that driving quality remains at the heart of new Fiesta – we had to ensure that the driving experience delivered on the promise made by its dynamic kinetic design," comments Schwarz. "I am confident we have met that promise."

5. Fiesta safety and body structure

- **Extensive use of high-strength steels throughout for strong safety performance**
- **More than 55 per cent of body structure features high-strength and ultra-high-strength steel**
- **Body structure lighter than predecessor, improving fuel economy and CO_2 emissions**
- **Ford's Intelligent Protection System (IPS) features first use of a knee airbag in a Ford small car, plus availability of head-and-thorax side airbags and safety curtain airbags**
- **Array of pedestrian protection features**

"The amount of high-strength steel used in the new Fiesta is remarkable for a car in this segment. It creates a very strong body structure that is essential in delivering a robust safety performance. It also helps us save weight, which is good for fuel economy and emissions."

Bernd Liesenfelder, Body Engineering Manager, Ford of Europe

Under the stylish exterior of the new Ford Fiesta is a robust body structure, crafted from high-strength and ultra-high strength steels to protect occupants in the event of a collision.

New Fiesta uses an exceptionally high level of cold-and hot-formed high-strength steels in its body structure for a car in this segment. More than 55 per cent of the body structure is high-strength steel, including grades of very-high-strength, dual-phase steel and ultra-high-strength aluminised Boron steel.

Ingredients like these make new Fiesta stronger and stiffer than ever. New Fiesta's new shape is approximately 10 percent stiffer torsionally than its predecessor, providing its occupants with a robust safety cell.

Yet, despite its advances in strength, new Fiesta's body structure overall is lighter than before. This means advancements in safety have not been achieved at the expense of key attributes, like fuel economy and CO_2 emissions.

"Safety is a very important attribute for the new Fiesta, but achieving real weight reduction was another key objective," says Liesenfelder. "High-strength steels – cold-and hot-formed – were the key to delivering the lighter weight and higher strength we needed for structural efficiency. We believe that the materials used on the new Fiesta are setting a new benchmark in the small car segment."

Structural strength for safety

Under Ford's safety strategy, high-strength steels are used in areas of the vehicle where structural strength and reinforcement are essential for crashworthiness. This includes the floor structure, front rails and beams and new Fiesta's ultra-rigid, integrated bodyside reinforcement ring to protect against side impact.

High strength materials were used to create a very stiff B-pillar section and stiff rocker section fore and aft. Impact loads are also transferred laterally to the opposite side of the car via chassis cross-members, to maximise dissipation of side impact forces.

This integrated bodyside reinforcement ring resists side intrusion in the event of a collision and helps the body structure manage the energy of other impacts effectively – be they frontal, offset or rear.

“Some people believe that just counting the number of airbags can gauge safety performance,” says Joerg Beyer, Chief Carline Engineer for new Fiesta. “At Ford, we count first on creating a very strong body structure to protect all occupants. With this robust structure as the first point of defence, we can then optimise our Intelligent Protection System to provide a tailored, protective response.”

To create the bodyside reinforcement ring, high-strength-steel elements were welded into an ultra-stiff structure whose crash performance was carefully developed using advanced computer simulation technology, long before its first real crash tests.

Elements of the bodyside reinforcement ring include:

- **A-Pillar** – New Fiesta’s slim A-pillar forms the forward part of the vehicle’s stylish roof arch. It is fashioned from ultra-high-strength aluminised Boron steel. The A-pillar delivers the strength and rigidity required for crashworthiness while remaining fashionably slim, as a key element in Fiesta’s dynamic design, and to minimise its potential to obscure driver visibility

- **B-Pillar** – Another Boron steel component, the Fiesta B-pillar reinforcement is shaped for ultra-high strength. Its job is to resist intrusion and retain its structural rigidity in the case of side impacts, while providing the strength to help the vehicle safety cell retain its shape in other crash modes

- **Rocker panels** – New Fiesta’s rocker panels, the lower rails to which the B-pillar is fixed, are crafted from very-high-strength, dual-phase steels renowned for their energy absorption properties

- **Rocker baffles** – To optimise the side-impact performance of the vehicle, uniquely shaped, twin-shear baffles are welded to the inner rocker panel. These stabilise the rocker section to ensure that it performs optimally in the event of a side impact. This is designed to make the rocker panel and B-pillar act as a system, with the B-pillar retaining its shape and its connectivity to the rocker panel in a side impact

- **Side roof arch** – Another dual-phase steel component – the side roof arch – joins with the A-Pillar to form new Fiesta’s strong roof profile and provide a robust top attachment point for the B-pillar

- **Lower A-Pillar** – The lower A-pillar is formed of very-high-strength, dual-phase 600-grade steel

These individual, high-strength elements are formed into an integrated subassembly during manufacture before they are joined to the vehicle on the production line. This new process ensures better joint strength and even better precision build for the overall body structure. It is also more weight efficient.

The new bodyside subassembly process required significant investment in the Fiesta body shops in the Cologne and Valencia Assembly Plants, but that investment is paying off in structural efficiency, according to Liesenfelder.

“We’ve discovered the strength benefits of the door rings when conducting both frontal and side impact tests,” Liesenfelder says. “The ring structure helps us to ensure minimal deformation of the door apertures in crash testing and is indicative of the integrity of the safety cell.”

Even more high-strength steel

More high-strength steel can be found in other key areas of new Fiesta’s body structure.

The dual-phase steel front frame rails and side rails feature structural actuation points – called trigger points – to initiate predictable collapse in crush zones. This is a key energy absorption feature. Forming the ‘triggers’ hardens the dual-phase material, giving it unique twin characteristics of energy absorption and energy resistance.

“The front of the rail is the crush zone, but then, to avoid overloading the backup structures, the rail is engineered to bend and counter-bend, while still offering very stiff resistance to further intrusion,” Liesenfelder explains. “We call this the ‘crush-bend-bend-bend’ strategy.”

New Fiesta’s underfloor structural beams – so-called ‘sled runners’ – also are formed from dual-phase steel, as are lateral floor reinforcements, which help the structure manage side impact forces.

Such extensive use of dual-phase steel inspired the Ford body engineering team to develop new engineering techniques. Because dual-phase steels acquire greater strength after stamping, the team worked to quantify how much this added strength contributed to the overall body structure. Defining the ultimate strength of the assembly would help Ford’s sophisticated crash simulation computers model crash performance with a very high degree of accuracy.

The new Fiesta team created a new computer map of the strength of the body structure taking into account the components’ ‘forming history’.

“Mapping the strength of the structure improves our understanding of the benefits of these dual-phase steels and increases our ability to predict structural behaviour accurately,” Liesenfelder says. “It’s this kind of attention to detail that has gone into defining new Fiesta and its safety performance.”

Reinforcements in the roof, doors and floors of the vehicle are made from other gauges of high-strength steel, including a Boron steel door beam on three-door models.

To support extensive use of high-strength steels, further manufacturing investment was required for new robotic welding heads equipped for mid-frequency welding to deliver optimal weld quality with the new materials, and replacing heads calibrated for normal 50 Hz welding used with milder steel grades.

Knee airbag for Fiesta

New Fiesta introduces a new knee airbag into its Intelligent Protection System (IPS), the first application of a knee airbag in a Ford small car. It is standard on Zetec and available as part of an optional safety pack on CL and LX.

The IPS links new Fiesta's restraints and passive safety technologies to perform as a single system designed to protect occupants in the event of a collision. The new knee airbag is aimed at protecting the driver from lower leg injuries in a frontal impact.

The 14.8-litre knee airbag deploys from the lower instrument panel. It joins a suite of other restraints technologies in new Fiesta's IPS, including:

- Dual front airbags for driver and passenger on all models
- New head and thorax side airbags for the driver and front-seat passenger standard on Zetec and available as part of an optional safety pack on CL and LX
- Three-point safety belts with dual-stage digressive load-limiting pretensioners for the front seat occupants
- Three-point safety belts for all three rear seat occupant positions
- Anti-submarining front seat design
- Whiplash-optimised front seats
- Beltminder safety belt reminder system for front seat occupants

"The availability of the knee airbag to IPS means we can tailor the response of other elements of the system more finely," says Gisbert Gaeb, Ford of Europe's manager for Safety Body Engineering.

Safety with customer choice

New Fiesta offers its customers the opportunity to choose the configuration of the Fiesta IPS, based on their individual needs.

"The majority of Fiesta customers drive alone," explains Gaeb. "We've oriented new Fiesta's IPS towards the driver and front passenger areas, but also developed additional safety options."

Head and thorax side airbags are standard on Zetec and available as part of an optional safety pack on CL and LX. They are designed to protect the head and upper body of front-seat occupants from side impact forces. The airbags deploy from the seat side bolsters, featuring a tuck-seam design that was developed by Ford safety

engineers to deploy the bag's upper shape quickly and accurately position it between the occupant's head and structural elements of the vehicle side.

New Fiesta IPS technologies benefit from extensive airbag sensor calibration testing. This detailed engineering work was conducted to ensure appropriate and timely deployment of airbags under most conditions, for example in angled impacts where front or side airbags could deploy additionally to provide even better protection.

New Fiesta is equipped with three-point safety belts for all five occupant positions, retractor pretensioner safety belts for the front seating positions and anti-submarining front seats.

The retractors pull the safety belts tightly to position the occupant ideally for airbag effectiveness, with a 'dual-stage digressive load limiting' feature that allows a slight reduction in belt tension to reduce risk of chest injury.

Ford Beltminder, a reminder system to encourage occupants to use their safety belts, is standard on new Fiesta.

More safety than meets the eye

New Fiesta's safety features extend beyond those you can see from the cabin.

A new front seatback design has been developed to give excellent whiplash protection. The design exceeded crash test requirements without requiring the use of active head-restraint technology.

New Fiesta also has an additional safety feature located under the carpet in the front driver's footwell. This is a special carpet underlay – called a 'crash pad' – situated between the floor panel and carpet, to minimise loading to the lower leg during an impact.

New Fiesta also offers ISOFIX child restraint anchors for outboard rear seating positions.

Looking out for pedestrians

The attractive face of new Fiesta is about more than just kinetic design-inspired styling. Also, it incorporates an array of features designed to protect pedestrians.

From major design elements – like its distinctive clamshell bonnet and sporty windscreen rake – to small details like the breakaway spindles of its new aero windscreen wiper blades or the finely shaped headlamps, new Fiesta has been thoughtfully crafted around pedestrian protection.

New Fiesta's clamshell bonnet helps protect pedestrians from impacting hard surfaces and sharp edges. Its rear corners are a particular pedestrian safety improvement, while its unique four-bar hinge – which allows the bonnet to open outward and upward – also plays a role in distancing the bonnet from the engine underneath.

The clamshell's interior structure is as important as its curvy exterior. The pedestrian protection design target was to minimise an underlying structure with hard points that could cause head injuries. The bonnet therefore incorporates an innovative 'hexagenous' architecture – a term coined by Ford engineers to describe the reinforcement that comprises joined-up hexagon shapes which create space between the bonnet and engine.

Hard elements like the windscreen wiper motor have also been relocated to the outboard side of the engine compartment to remove other potential hard points of contact.

The front bumper design is another pedestrian-friendly design element. Its shape, known as a 'tri-plane curvature', comprises three curves, or planes, rather than being a continuous curve. This limits the exposure of a pedestrian to the most damaging perpendicular impacts with the bumper.

The bumper also includes an integrated energy-absorbing grille insert which acts as another key pedestrian safety element. It has been engineered with specific deformation properties to avoid causing pedestrian lower leg injuries.

New Fiesta also incorporates a lower leg stiffener behind the fascia in the area of the lower spoiler. Its function is to ensure the pedestrian's lower leg remains vertical and is not allowed to rotate below the vehicle.

Safety engineers and designers worked hand in hand to shape the fine detail of new Fiesta's distinctive headlamps to protect pedestrians, particularly children. The location and dimensions of the headlamps – a key design element of the front end – were carefully designed to minimise exposure for direct contact with the head in an impact. This is matched to the steeply raked 'pedestrian-friendly' windscreen.

"New Fiesta is a clear example that making a safe car doesn't mean making a large car, or a heavy car. There is no need to compromise between safety and good design or driving character," concludes Liesenfelder.

6. Fiesta comfort and convenience

- **'Big car' features brought to a small car**
- **Several firsts for the small car segment, including Ford EasyFuel capless refuelling**
- **Maximum driver comfort with improved seat position and adjustment and steering wheel adjustable for height and reach**
- **Mobile phone-inspired entertainment system**
- **Intelligent interior increases space and storage without increasing exterior dimensions**

"New Fiesta brings important big-car features into the small car arena. These features, like cruise control, Ford EasyFuel and high quality entertainment systems, reinforce the stylish appeal of the new Fiesta. You immediately feel the quality of a bigger car that will be at the core of the new Fiesta ownership experience."

Giovanni De Pasca, Driving Environment and Occupant Package Manager, Ford of Europe

The new Ford Fiesta has been developed around a philosophy of bringing 'big car' premium features to the small car segment, for the comfort and convenience of driver and passengers.

High-quality finishes, appealing, contemporary materials and user interfaces inspired by mobile phones communicate immediately that new Fiesta is no ordinary small car.

"Elements like these are crucial in extending the traditionally rational appeal of Fiesta into something more emotionally appealing," says Giovanni De Pasca. "Today's small car buyers are concerned about more than cost and functionality. This new generation is very discerning about style, both the big picture and the small details. We're confident that this new-generation Fiesta will be highly appealing to them."

Cockpit character

New Fiesta is designed to deliver a 'cockpit' feel, with major functions oriented towards the driver, ensuring core controls are within easy reach, including the new In-Car Entertainment (ICE) system in the centre console.

This 'cockpit' character is accentuated by a 30mm lower seating position, a higher instrument panel and a 20mm higher gearshift placement versus the previous-generation Fiesta. New Fiesta also introduces steering wheel-mounted controls for key audio and vehicle systems – another 'big car' feature already found on Mondeo.

Extensive, detailed work was undertaken to create a driver's seat that was comfortable, yet offered sporty styling and wide-ranging adjustment. Significant back and thigh support has been engineered into the seat, to complement new Fiesta's driving character, without compromising comfort.

The driver's seat now adjusts up and down by 55mm to accommodate different driver's needs, which is a first for Fiesta. A 286mm fore and aft adjustment also offers a significant improvement.

This combination of lower seat mounting and greater adjustment also ensures headroom is not compromised even for the tallest drivers, despite new Fiesta's lower, sportier exterior profile.

The driving position has also been improved in its angle to the steering column, which is now four-way adjustable for reach and height and located at a more vertical angle to the driver, for greater comfort and enhanced 'cockpit' experience.

"It was important for us to create a driver's seat that both looks the business and does the business," says Giovanni De Pasca.

Virtual interior for better visibility

In optimising new Fiesta's interior package, engineers made extensive use of the Computer Aided Virtual Engineering (CAVE) system, first used on the new Mondeo.

CAVE uses a combination of computers and projectors to create a virtual life-sized interior of a car. Using a specially designed rig, a real car seat is fixed into the appropriate position for the driver who can then evaluate all-round visibility as well as comfort levels for reaching the steering wheel and operating major controls. This system proved invaluable to designers and package engineers when shaping new Fiesta's interior.

The driver's rearward view was also optimised using the virtual-reality CAVE system. Detailed work was undertaken among design, package and ergonomics experts to shape the rear glass of the new Fiesta for ample visibility within its kinetic design shape.

As a final touch of comfort, new Fiesta features a full footrest for the driver, the first Fiesta to offer this on both left- and right-hand drive models.

Mobile phone inspired convenience

The striking centre stack on new Fiesta's instrument panel is the heart of new Fiesta's ICE. As such, it needed to be instantly intuitive to all types of customer, as well as a creative and attractive piece of interior design.

The new Fiesta team sought inspiration away from traditional automotive switchgear and studied the use and architecture of mobile phones to determine the most intuitive interactive platform.

The Human Machine Interface (HMI) strategy for new Fiesta focused around three pillars that were also used in developing the system for the latest Mondeo:

- Simplicity and integration
- Usefulness and personalisation
- Controllability and automation

In new Fiesta, the result is a HMI that separates the traditional entertainment system elements – screen, controls and electronics – into a mobile phone-inspired user interface.

Dr. Stefan Becker, Supervisor, HMI Development, explains: “Mobile phones have internationally recognised interfaces and orientations, with the goals of being stylish, yet simple to understand and operate. We wanted to use this core understanding that customers now share across the world to move away from a traditional automotive approach.”

The design was heavily researched and tested by the ergonomics and HMI teams – both in laboratory conditions and with real customers – to prove its safety and simplicity. The driver is able to operate easily the ICE unit with minimal distraction while driving.

Internationally recognised symbols, as seen on a mobile phone, are pictured both on each button and on the screen for easy control and coordination, while the control buttons are purposely slanted to give a stylish look and to highlight the red illumination in the button dividers.

During development, a major focus on details made for significant ergonomic improvements. For example, the centrally-located ‘OK’ directional button is a toggle button, with an added option of voice control to operate ICE functions.

Also, on the finished design, each button slants inwards for the finger to slip into so other buttons are not pressed by mistake. Angled controls and buttons make operation easy and relaxed and an outward dimple is placed on the centre button, just like a mobile phone, acting as a clear centre-point reference. Many functions can now also be controlled via intuitive steering wheel-mounted toggle switches, minimising the need for the driver to take their eyes from the road.

Ergonomics development even extended to the size of each button. The team increased the size of keys for the finished design, to the point that it now meets the requirements of about 95 percent of male sized hands.

These subtle but important developments ensure the driver can operate the various functions easily, and refer quickly to a clear, high-mounted, 89mm (3.5 inch) screen, thus minimising distraction time when focusing on the road ahead.

“The new Fiesta HMI system needed to be readily understood, intuitive to operate and easy to control, for people of all shapes and sizes. In creating it, we also made new Fiesta the first small car with a screen of this size plus multi-media functionality,” says Becker.

Ford EasyFuel heads big car features list

New Fiesta brings to the small-car arena an array of features normally found on big cars. Leading this list is the innovative Ford EasyFuel system. EasyFuel means never having to wrestle with a fuel filler cap again.

EasyFuel, first introduced by Ford on the new Mondeo, is more than a convenience feature.

Ford EasyFuel is simple and easy to use. The lack of a conventional cap, which would need to be removed prior to fuelling the car, reduces the danger of fingers becoming tainted with fuel.

Mechanical devices around the nozzle opening and a special flap at the top of the fuel filler neck operate together to seal the opening and ensure the system is as secure as a properly fitted conventional filler cap. EasyFuel has been tested to rigorous internal Ford safety standards, including an 80km/h barrier crash test, to verify its robustness against fuel leakage.

Brighter lights

Night-time driving will also be made more comfortable by new Fiesta's adoption of high-intensity, projector beam headlamps, fitted as standard to Zetec models.

Driver aids

Cruise control is another feature that has migrated from larger Ford cars into the new Fiesta LX and Zetec models.

Beyond the convenience and driving ease cruise control represents, it can also assist new Fiesta's fuel economy. Cruise control helps keep the vehicle at the desired speed more accurately and efficiently than the driver can, especially over long distances, making highway cruising more fuel-efficient.

New Fiesta's cruise control features steering-wheel mounted controls for driver convenience.

Other 'big car' features available for new Fiesta include:

- 'One-shot up' power driver's window
- Rear power windows on LX and Zetec five-door models
- Power mirrors, even on entry-level models, finished in body colour, with integrated side indicators and featuring 'radius' glass to improve the scope of rearward vision in both mirrors.
- Reach-and-rake steering wheel adjustments to help drivers optimise driving position. This combines with Fiesta's improved seat-height adjustment capability for ergonomic flexibility
- Flexible 'aero' wiper blades, with improved sweep ability and sound refinement. The system features asymmetrical blades – 600mm long on the driver's side, 425mm on the passenger side, for a wide sweep arc

Space and storage zones

From the outset, Ford designers and ergonomists worked together to create an interior that is as intuitive as it is attractive. New Fiesta was created to accommodate the broadest possible range of individuals – from the 2.5 percentile female, to the 97.5 percentile male – and the broadest possible requirements.

As a small car that was designed to stay small, the challenge for new Fiesta's development team was to improve the interior space and stowage for driver and passengers, without increasing the overall dimensions of the car.

Ergonomists divided new Fiesta interior into zones for each occupant, to ensure storage areas, switches and controls were all within comfortable reach. At the same time, Package teams were working on ingenious new storage options for new Fiesta. The combined result is space and storage zones that are convenient for all occupants.

Sitting in new Fiesta, the space is immediately obvious. Front legroom has increased by 11mm over the previous-generation Fiesta and is best in class at 1069mm. Generous front shoulder room of 1350mm and headroom of 991mm combine to create a comfortable environment for any length of journey.

Rear seat passengers are not forgotten either. Despite its sweeping exterior profile and high belt line, new Fiesta still offers 953mm headroom for rear seat passengers, together with 1297mm shoulder room and rear legroom of 823mm.

In five-seat mode, new Fiesta has 281-litres of luggage space, which rises to a cavernous 965-litres in two-seat mode. Rear seats offer single-motion folding capability for stowage of larger items – an action which does not require lifting the rear seat cushion or removing the headrests.

A low boot lip (702mm from the ground) and broad opening to the rear hatch (606mm high, 996mm wide) make loading and unloading easy and practical.

Useful and ingenious storage spaces abound throughout new Fiesta's cabin, and are convenient for all occupants. Chief amongst these is the eight-litre glovebox on the front passenger side, capable of storing items of different sizes from CDs to drinks cans and bottles. Other storage areas include:

- Large front door bins, capable of storing 1.5-litre bottles or a sizeable road atlas
- Central storage pocket in the centre console stack
- Open storage bin in front of the gearshift, with non-slip surface, for keys or wallet
- Open storage space in front of handbrake with USB socket and 12-volt power connector for MP3 player or mobile phone
- Two 0.4-litre cup holders alongside an offset parking brake
- Storage bin at the rear of the centre console, large enough for a handbag/CDs and easily accessible for rear passengers

7. Fiesta power

- **New Fiesta powertrains deliver better fuel economy and emissions**
- **New top-of-the-range 1.6-litre Duratec Ti-VCT petrol engine**
- **New Electric Power Assist Steering (EPAS) contributes further to fuel consumption reductions**

"New Fiesta makes an important step forward in achieving significant reductions in fuel consumption and CO_2 emissions. But if you think we have compromised Fiesta's performance feel and driveability in the process, think again."

Dr. Nigel King, Powertrain Engineering Manager, Ford of Europe

Power up – emissions down

Across the model range, new Fiesta combines an enhanced and efficient powertrain line-up with weight reductions to deliver better fuel economy and reduced CO_2 emissions.

"It's here that all the hard, uncompromising work by the Fiesta team really pays off for the customer," says Joerg Beyer, Chief Carline Engineer for new Fiesta. "Reducing fuel consumption and CO_2 emissions was absolutely central to our powertrain development strategy for new Fiesta. It's important to customers; it's important to Ford and it's important to governments. We believe the results of our efforts make new Fiesta truly a compelling choice for environmentally aware drivers."

New Fiesta's Electric Power Assist Steering (EPAS) system also plays its part. Compared with traditional hydraulic power-steering pumps which operate constantly, EPAS only operates when steering assistance is required. Ford powertrain and vehicle dynamics engineers carefully calibrated the system for optimal steering precision and feel for the driver, as a primary driving quality objective for the car.

All powertrains fitted to new Fiesta achieve Euro Stage IV emissions standards.

New Duratec Ti-VCT Engine

Fiesta provides a new powertrain choice for the customer with the introduction of a more powerful, 1.6-litre Duratec Twin Independent Variable Cam Timing (Ti-VCT) petrol engine, which produces 88kW of power at 6000rpm.

Despite its feisty character and its 14 extra kilowatts, the new Duratec Ti-VCT is still more fuel efficient than the 1.6-litre engine in the previous Fiesta. The new engine returns a fuel economy of 6.1 litres per 100 kilometres and CO_2 emissions of 143g/km.

The responsive new Duratec Ti-VCT engine delivers strong torque output across the mid-rev range, peaking at 152Nm at 4050 rev/min, and it uses twin independent variable cam timing to provide the optimal balance of performance and fuel economy.

This high-tech engine features map-controlled fully independent variable camshaft timing on intake and exhaust camshaft. Featured in the second-generation Ford Focus and the latest Mondeo, it offers very good fuel economy in combination with high performance.

The Duratec Ti-VCT also features an aluminium cylinder head and block.

Automatic transmission

The new Fiesta range also features an automatic transmission option:

- A 1.4-litre Durashift 4-speed automatic, which produces 71kW of power at 5750rpm and 128Nm of torque at 4200rpm. The 1.4-litre auto achieves a fuel economy of 6.9 litres per 100 kilometres and CO_2 emissions of 164 grams per kilometre.

Performance still key

Beyond fuel economy and emissions, the new model is set to extend Fiesta's reputation as a sporty driver's car with enhancements to its trademark performance feel and driveability.

"Sportiness has been a core part of the Fiesta personality," Joerg Beyer says. "It was important that we didn't sacrifice that important attribute while making those fuel-economy gains. Performance feel is even better in the new Fiesta and we've made some key driveability improvements, too."

New Fiesta also features carefully mapped accelerator pedal response calibration. The electronic throttle has been tuned to respond differently depending on how much and how sharply the throttle is applied. Aggressive throttle inputs generate a sharper, sportier response, while gentle throttle inputs deliver a smoother, progressive feel.

"Accelerator pedal response mapping is the result of attention to the smallest of details to enhance the driving experience," Beyer explains. "Our general philosophy in calibrating the Fiesta engine range was to flatter the novice driver and reward the expert."

Stall prevention

Cars like new Fiesta are often the choice of new drivers. New Fiesta's stall prevention system is one way in which Fiesta makes it easier for beginners and drivers faced with stop-start traffic or challenging parking manoeuvres.

Stall prevention is a unique engine mapping profile to reduce the potential for the vehicle to stall when moving away from stationary. The system anticipates when the driver is going to pull away. When the clutch is engaged, the engine's ignition profile is altered to increase the amount of available torque. The system was developed based on typical car parking manoeuvres.

The anti-stall technology is absolutely seamless to the driver – whether novice or experienced – and makes new Fiesta easier to drive in city traffic, easier to manoeuvre into tight parking spaces and more pleasurable for all drivers.

Packaging power efficiently

New Fiesta's design reflects the careful packaging of powertrain components in the engine compartment. This was a key area of co-operation between Ford and Mazda in developing the shared technologies of the new generation of Ford Motor Company small car products. Extensive computer-aided-design work was conducted to package the engine and its ancillary components, such as hoses, cables and hard components into a tight space while protecting them from heat, movement and harmful vibrations and ensuring optimal crashworthiness.

Concludes Joerg Beyer: "Thanks to its mix of careful calibration and latest powertrain technology, new Fiesta is a tailored driving experience, carefully and precisely tuned to respond to all drivers and driving styles."

8. Fiesta ownership experience

- **New levels of fuel economy and efficiency, one of the top contributors to cost-of-ownership**
- **Intelligent approach to manufacturing to minimise repair costs and lower insurance ratings**
- **New electrical architecture for reduced complexity and simpler maintenance**
- **Tested to exacting standards for durability and reliability**

"Fiesta has always stood for value, in both its purchase price and its running costs. While bringing a new design, big-car features and technologies, new Fiesta upholds this tradition with its affordable ownership experience."

Joerg Beyer, Chief Carline Engineer, Ford of Europe

In new Fiesta, Ford has delivered a contemporary small car, designed and engineered to appeal to a discerning and demanding generation of customers. However, doing so could not be at the expense of affordability and durability in the ownership experience. So while new Fiesta incorporates the latest in design, engineering and manufacturing techniques, extensive thought and effort has ensured it still stands for value for money and reliability.

Keeping a lid on cost

Helping owners minimise running costs was a key development objective for new Fiesta. Central to Ford's philosophy is to ensure that the cost of low-speed crashes, like car-park 'fender benders' is minimised. New Fiesta features the use of bake-hardened steel on its front wing shapes, which offers better resistance to the dings and dents of daily driving, such as when parking in tight spaces.

New Fiesta's headlamps and tail lamps are optimised for crash resistance, positioned high, away from potential impact. New Fiesta's headlamp unit features its own front crush zone designed to prevent more costly structural damage to the front-end structure.

The front bumper features a robust and strong horizontal beam of dual-phase steel to resist and control crash energy. It is backed by specially shaped 'crash cans' designed to collapse predictably in an impact. These crash cans are termed 'sacrificial parts', whose mission is to prevent more extensive damage and higher repair costs. Similar crash cans are found on new Fiesta's rear bumper beam.

At both front and rear, these elements are hidden beneath shaped bumper covers painted in body colour. New Fiesta's front bumper installation incorporates fog lamps when specified and a specially designed insert for the large, trapezoidal lower grille, plus pedestrian protection and aerodynamic features.

At the rear, the bumper assembly incorporates a snap-out integral tow-eye cover in its design.

Modern electrical nerve system

"In electrical terms, new Fiesta is a highly 'multiplexed' vehicle, meaning its electrical systems carry multiple signals for different functions," explains Christof Kellerwessel, Chief Electrical Engineer for new Fiesta. "Multiplexing greatly reduces the complexity and weight of the vehicle's wiring, without reducing its many features."

New Fiesta's electrical structure incorporates three CAN-Bus networks:

- High-speed underbody CAN-Bus for the communication and control of key systems, such as the powertrain control module, ABS and ESP systems, Electric Power Assist Steering (EPAS), transmission control module and the restraints control module of Fiesta's Intelligent Protection System
- Medium-speed for CAN-Bus for key upper body systems, such as its body control module and electronic automatic temperature control system
- Dedicated multimedia bus for audio features and Fiesta's multi-functional Human Machine Interface

Linked to these three key CAN-Bus networks are several LIN (Local Information Network) connections which allow the optimisation of feature functionality.

New Fiesta's electrical system features an integrated connection for vehicle diagnostics, which assists service technicians in the field.

Another major feature of new Fiesta's electrical system is its introduction of a Central Car Configuration (CCC) feature. This system stores all market-related vehicle specifications and broadcasts them to the rest of the vehicle. The instrument cluster acts as the CCC master module, which helps in assembly to ensure the vehicle is built to the correct specification and in service to maintain the vehicle.

The instrument cluster also controls another clever new Fiesta electrical feature known as 'load management'. Load management ensures that new Fiesta uses power smartly by analysing the electrical load required and deciding how it can be accommodated, based on the state of the battery and general charging information.

Built small – built tough

For most customers, a car's ownership experience is defined by its reliability. So when it came to testing new Fiesta's durability, no compromises were made. Although Computer Aided Engineering (CAE) helped reduce the development time and the number of prototype vehicles required, the work of Ford durability engineers is ever more extensive.

"There are many things about new Fiesta customers will not anticipate, but one thing they will expect is that their new Fiesta is reliable and durable, each and every day," says Jan Belmans, Durability Manager, Ford of Europe. "That's why we have considered durability at every stage of development."

New Fiesta has been engineered and tested for a life of at least 240,000 kilometres or 10 years, meaning the new small Ford meets the same rigorous standards as the larger Focus and Mondeo.

To reach such standards, new Fiesta's durability has been assessed at each stage in its development, including CAE, component, system and vehicle levels, with a total of 3.5 million kilometres of on-road testing. Specific durability testing actions included:

- More than 550 component and system level lab tests to verify durability, functionality, serviceability and degradation over a vehicle's lifetime
- Doors, tailgate and bonnet life tests, with more than 300,000 operations in real world environmental conditions, including dirt, dust, salt, humidity and temperatures ranging from -40 degrees Celsius to +80 degrees Celsius
- 41 prototype test vehicles on public roads, in a variety of driving cycles, accumulating up to 45,000 kilometres per vehicle every eight weeks

As with larger members of the Ford of Europe family, new Fiesta's durability testing has extended beyond the hands of its own engineers. As soon as they were available, production-quality test vehicles were placed with real high-mileage customers, such as nurses, delivery drivers and the Red Cross, allowing reliability to be closely monitored, even at distances beyond the standard warranty period. In total, 20 production-level vehicles were placed with test customers, each accumulating up to 100,000 kilometres per year.

The result is a new Fiesta which can boast reliability credentials as robust as much larger vehicles. Combined with the intelligent application of new technologies and a razor-sharp focus on reducing weight, it creates a new Fiesta as affordable as it is attractive.

Big-car manufacturing techniques

New Fiesta is manufactured with sophisticated techniques more commonly found in big-car production. Areas of the new Fiesta assembly plants in Europe – and eventually in Thailand, China and the Americas – look like film sets. High-intensity lights and cameras are used by robotic assembly technology to position glass and doors on vehicles with meticulous accuracy.

Robotic systems ensure that new Fiesta glass and closures are installed accurately, which helps ensure high levels of quality and reduces the potential for squeaks, rattles and wind noise issues for the customer.

Fiesta introduces bar-coded windows to facilitate this high-tech process. A robotic camera selects the right piece of glass through the use of these barcodes. It then applies adhesive to the glass and brings it into position on the car body on the assembly line.

To aid in the final placement of the glass, high intensity lamps light the body surface and an array of cameras guides the glass perfectly into position. All of new Fiesta's glass is fully encapsulated.

Similarly, robotic positioning of full instrument panel assemblies is part of the Fiesta production process. Instrument panel assemblies are increasingly complex and unwieldy. Automating this installation is another key measure to avoid squeaks and rattles – reinforcing the perceived quality of the car's materials.

New Fiesta's architecture features rigid front and rear subframes which incorporate powertrain and chassis systems. Built-up front subframes are 'married' to the Fiesta body structure in an automated system, which precisely positions the subsystem and fastens it rigidly to the body via robot-installed stretcher bolts.

Ford production experts introduced these and other features in the new Fiesta production process into the initial assembly plant – Germany's highly efficient Cologne Assembly Plant – without shutting down existing Fiesta production. The new Fiesta production team invaded the plant on weekends, using downtime to install and verify new systems on the existing line. This highly efficient approach was undertaken to speed the process of ramping up to volume production with the introduction of the new model.

The Cologne plant's systems will be replicated in Spain, where the highly flexible Valencia Assembly Plant will augment European production. Similar methods are being undertaken in Rayong, Thailand, and Nanjing, China, where Fiestas for key Asia Pacific markets will be manufactured. Production in the Americas will follow in 2010.

"New Fiesta proves how you can make a small car affordable and reliable, without reducing quality or features," concludes Joerg Beyer. "That's the key to making new Fiesta truly desirable."

9. Fiesta success story

- **32 years at the top of the sales charts in Europe, total sales of 12 million**
- **Efficiency, style and value for money – core Fiesta values from outset**
- **Commitment to driving quality and performance creates legacy of awards, on road and track**

"Fiesta represented change when it first came on the automotive scene, and while it has moved with the times and fashions over the years, it has remained steadfast in its dedication to provide economical, practical and dependable transportation for people of all ages. That mission is just as relevant today as it was in 1976."

John Fleming, President and CEO, Ford of Europe

For the past 32 years, Ford Fiesta has provided practicality and driving pleasure to millions of customers across Europe. But Ford's small car heritage stretches even further and Fiesta was designed and built to the same fundamental principles that created the Model T 100 years ago.

Born with a mission

Born in 1976, Fiesta was the product of Ford's mission to build a new European small car with modern features and a respectable price tag. Although new Fiesta appears very different from the original, it continues to promote those same fundamental principles and carries forward many of the attributes of the original.

Production of Fiesta first started in Valencia, Spain, in 1976, as part of Henry Ford II's plan to efficiently build a global car which helped build the Spanish market into a serious European player in automotive production. During the latter years of the 20th Century, Fiesta production expanded to include Ford plants in Cologne, Germany and Dagenham, Britain.

As a consequence, the Fiesta name became ingrained in European culture and is a brand that has attracted a loyal and dedicated following.

A continued commitment

Ford's commitment to driving quality and innovative technology has played a key role in keeping Fiesta at the forefront in the small car market. Since day one, Fiesta owners have benefited from low fuel consumption supported by economical running costs, favourable base price, excellent safety and attractive styling.

One of many highlights in Fiesta's life include the 1983 Fiesta MK II which featured a homologated fuel consumption of 3.8 litres/100 km at a constant 90 km/h making it one of the most economical cars in the world. It was also the only vehicle of its size to offer diesel power.

In 1989, the Fiesta MK III introduced an SCS (Stop Control System) anti-lock braking system to the small car market.

Throughout its life, Fiesta has brought excellent safety to the road. In 1993, crash behaviour was optimised thanks to Ford's early computer simulation programmes and Fiesta was equipped with an innovative steering wheel to reduce the likelihood of head injuries in accidents. Airbags became a standard feature in the Fiesta from 1994.

Another place where Fiesta has kept up with the times is in consumer acceptance, measured by sales data. Ford's popular small car sold a record 648,781 units in 1992 alone.

For the past seven years sales have increased year on year, with annual sales in 2007 of 414, 641. More than 12 million Fiestas have been delivered to customers in Fiesta's colourful 32-year history.

Sporting prowess

Fiesta has also flexed its sporting muscle by introducing performance enhanced models over the years. The Fiesta Super S sparked off the first of many versions, featuring a lowered chassis, lightweight alloy wheels and a refined interior. A more noticeable characteristic came from its widened bumpers and striking feature stripes along the flanks and rear.

Fiesta made its motorsport debut at the 1979 Monte Carlo Rally. Finnish superstar-to-be Ari Vatanen rallied his Fiesta to 10th place – a huge achievement considering the car was developed under enormous time pressure and during an industrial strike in Britain.

Meanwhile, the awards kept rolling in. Fiesta's remarkable portfolio includes prestigious titles such as 'Car of the Year 1989', 'Best Small Car in the World', 'Smartest Small Car', and 'Best City Car'.

Inspired legacy, bright future

The German artist H.A. Schult from Cologne best describes just how much impact the Fiesta has made on the imagination: "No other industrial product has inspired people's imaginations more, moved their dreams more strongly, changed their daily lives and influenced their towns and countryside. Fiesta is the symbol of a car that is there for everyone."

After 32 successful years, Fiesta is once again poised to lead its competitors into a new era of small cars. Having established a long legacy and created a brand instantly recognisable to millions of customers, the all-new Fiesta is more than ready for the challenge of its competitors in the future.

# # #

Ford news releases and high-resolution photographs are available at www.autonews.net.au