

This press pack accompanied the UK launch of the third generation Avensis in December 2008. The model underwent some changes during its time on sale, which can be tracked using the Timeline feature on the third generation Avensis archive web page. Additional information about Avensis can be obtained from the Toyota press office.

THE NEW TOYOTA AVENSIS

Designed and engineered in Europe and built at Toyota's Burnaston factory in the UK, the all-new third generation Avensis builds on the success of its predecessors. Toyota's new European flagship has a sleek, athletic design and strong, dynamic character. And with more powerful, cleaner engines, it emits less carbon dioxide, uses less fuel and provides improved quality and enhanced equipment levels across the range.

First launched in late 1997, Avensis has increased its share of the European D-segment from six to eight per cent. Toyota expects the new model to further strengthen its market performance.

Quality, strength and safety

The second generation Avensis set high standards for design, comfort and safety. In Euro NCAP crash testing it set a new high points score for adult occupant protection for the segment and was the first model in its class to provide a driver's knee airbag as standard.

Toyota was determined to increase European input into the third generation Avensis and to this end Chief Engineer Takashi Yamamoto drove more than 3,000 miles north to south across the continent, crossing 10 countries on the way to gain a true insight into the needs and preferences of D-segment motorists.

Mr Yamamoto explains: "We have put a strong European mark on the project from the start. Thirty-five engineers from Toyota Motor Europe were invited to Japan to join forces with the Toyota Motor Corporation development team. When the project team returned to Europe for finalisation, these engineers played a key role in the knowledge transfer between the two development teams.

“I think this is one of the key reasons why today we can look back at a highly efficient development process and be proud of our achievement, which I believe is nothing less than the ‘cutting edge’ of the D-segment.”

Lower CO₂ emissions and fuel consumption, higher performance

One of the principal challenges facing the new Avensis design team was to create a car that is powerful, safe and fun to drive, but which also makes a substantial contribution to reducing carbon dioxide and other harmful emissions.

“With the rapid social advances of the 21st century, our lifestyles have become extremely complex,” says Wahei Hirai, Managing Officer, Toyota Design Centre. “People’s demands on their cars have accordingly become diverse. Drivers are not satisfied with cars that are simply fast and comfortable. Today, more owners are concerned about safety, ecology and social responsibility.”

Chief Engineer Takashi Yamamoto explains: “When we started to plan the third generation Avensis, we were determined to build on the strengths of the current model with features such as well-proven safety levels, and highly appreciated quality and performance. However, we also had to predict what factors would be important in five to 10 years’ time to ensure Avensis remains competitive throughout its lifecycle.

“One of the main development requirements we identified was the importance of CO₂ emissions. Whatever product we launch today has to contribute to bringing CO₂ levels down. Wherever possible, in every part of the vehicle, we have applied all our engineering efforts to reduce CO₂ and fuel consumption.”

New Avensis benefits from the application of innovative Toyota Optimal Drive technology in its range of powerful new petrol engines, upgraded diesel power units and advanced new transmissions. These powertrains give customers reduced emissions and fuel consumption without compromising power and driving pleasure. Thanks to Toyota Optimal Drive, new Avensis will help bring Toyota’s fleet average CO₂ emissions to below 140g/km by 2009. The result for the European Avensis fleet as a whole is to 6.7g/km reduction in emissions to 153.5g/km.

Athletic Design

- Created using Toyota's Vibrant Clarity design language
- Inspired by J-factor – the essence of Japanese originality and global appeal
- Greater perceived space and quality

Conceived at ED², Toyota's design studio in the South of France, new Avensis expresses power without relying on sheer mass. Toyota's Vibrant Clarity design language was used to help meet three key challenges: -

- To project power, without being a massive car
- To be dynamic to drive, but with top class ride comfort
- To deliver low emissions and fuel consumption, yet with impressive performance.

“New Avensis innovates athleticism by balancing opposing elements of dynamism and comfort, emotion and functionality, image and self-gratification,” says Simon Humphries, General Manager, Toyota Design Centre. “This is not done by relying on mass to express power, but through synergy of opposing elements.”

New Avensis will be available in saloon and tourer body styles. These were created in parallel, so the tourer was designed specifically for its purpose, rather than being simply an elongation of the saloon with a raised rear end.

Chief Engineer Yamamoto explains: “We wanted the third generation Avensis to be innovative and dynamic, carrying over the positive character of the second generation model, but making it stronger and more robust.”

Vibrant clarity

Vibrant Clarity is a design ethos that aims to give future vehicles an original identity and emotional intensity that will be uniquely identifiable as Toyota. It provides the key to solving the long-standing paradox of how to create cars that are energised and dynamic (*vibrant*), yet at the same time rational and ingenious (*clarity*).

“In our design process, bringing contradictory elements into harmony is central to the creation of new design values,” says Wahei Hirai. “This way of thinking originates from Japanese aesthetics. This is what we call our J-factor. J-factor is quite simply Japanese originality that will have global appeal.”

The three fundamental elements of Vibrant Clarity were applied in designing new Avensis: Perfect Imbalance, Integrated Component Architecture and Freeform Geometrics.

Perfect Imbalance

The prevalence of asymmetry in Japanese aesthetics can be described as Perfect Imbalance. An unexpected element in an otherwise perfect composition is often the thing that makes it more natural, enthralling and dynamic. Typical notions of vehicles that look balanced are often easy to understand at first, but soon become boring. Creating energy and vitality in the overall proportions of a vehicle is essential to an enduring design.

In profile new Avensis has an almost monoform appearance, with the cowl pushed forward and the rear pillar pulled back, creating a distinct identity. The elevated front end of the vehicle flows seamlessly into the monoform cabin and steeply wedged beltline and on to the raised boot to create a unique shape with excellent aerodynamics.

Using the concept of Perfect Imbalance, designers stretched the front and rear pillars to create a flowing form, without compromising interior spaciousness. They also succeeded in creating a low, aerodynamic bonnet while at the same time optimising pedestrian safety performance. The car has excellent aerodynamics, with a drag coefficient of 0.28 for the saloon and 0.29 for the tourer, helping reduce CO₂ emissions.

New Avensis is only 50mm longer than the previous generation model, with overall length of the saloon 4,695mm and the tourer 4,765mm. Both versions have the same 2,700mm wheelbase and 1,480mm height as their predecessors, but thanks to the car's new platform, the front track has been increased by 45mm and the rear track by 30mm. The overall width of the vehicle has grown by 50mm to 1,810mm. Moving the wheels further towards the edge of the floorpan has given the car a more solid and powerful presence, without adding unnecessary weight or bulk.

Integrated Component Architecture

As the term implies, Integrated Component Architecture aims to create striking features that contribute to the complete form of a vehicle while giving an emphasis to each individual component.

For example, the wrap-around architecture of the bonnet on new Avensis clearly expresses the vehicle's construction, but at the same time is integrated into the overall shape. The same effect is achieved at the rear, with a character line in the bumper that flows out towards the corners, connects the rear lamp clusters and finally integrates with the body.

Freeform Geometrics

Freeform Geometrics describes how Vibrant Clarity is applied to the vehicle's surfacing. A clear combination of geometric lines and surfaces with a hand-made feel gives a simple but seductive overall aesthetic effect. The surfaces are almost mathematical in their precision, but at the same time have movement and emotion to keep the design fresh and energised.

Greater perceived space and quality

The previous generation Avensis was praised for its roomy interior and on the new model Toyota worked to heighten the perception of space by moving the A-pillar forward by 110mm and the C-pillar back by 50mm. Cargo space in the tourer is more flexible, with cargo rails available to divide and secure separate loads. Retractable rear seats have a one-touch folding mechanism to create extra space when needed in both saloon and tourer.

The new-look instrument panel makes good use of the car's width to emphasise the spacious feel of the interior. This can be further heightened in the tourer with the option of a panoramic roof.

Materials used in the cabin have been chosen to express prestige and dynamism. The dashboard trim, in black or grey-beige combination, has a soft-texture grained finish. There is a choice of finishes for the centre console, including black metallic paint and a titanium finish. On higher grade models, the console has a graphic finish inspired by *Takesumi* – a charcoal made from bamboo.

The speedometer and tachometer are crisply lit and have chrome bezels. The Optitron display ensures excellent legibility, regardless of lighting conditions, helping reduce driver fatigue.

Toyota Optimal Drive: increased power and torque with lower CO₂ emissions and fuel consumption

- Innovative Valvematic petrol engine technology gives more power and lower CO₂ emissions and fuel consumption
- Upgraded D-4D and D-CAT diesel engines with up to 10 per cent lower CO₂ emissions and fuel consumption
- New six-speed manual and Multidrive S transmissions with petrol engines, new six-speed automatic available for diesels

Avensis owners no longer have to choose between fuel efficiency and performance. Both are now standard across the range, as every new Avensis benefits from Toyota Optimal Drive: innovative solutions that deliver a powerful balance of reduced fuel consumption, low CO₂ emissions and uncompromised driving pleasure.

Toyota Optimal Drive is made possible by a line-up of new engine technologies and advanced transmissions with low friction components, lightweight compact design and enhanced combustion efficiency.

On new Avensis's petrol engines, Toyota Optimal Drive maximises efficiency, power and torque through new Valvematic technology that allows optimal valve lift and timing to generate top-level performance.

For the diesel engines, a series of component systems have been re-engineered to enable higher performance while emitting fewer emissions and using less fuel. Advanced and highly responsive Multidrive S and six-speed automatic transmission technology give smooth, efficient driving quality.

Valvematic petrol technology

- More effective combustion process gives lower emissions
- Reduced pumping losses increase fuel efficiency
- Higher inlet valve lift gives increased power
- Reduced air intake delay provides better engine response

One of the key elements of Toyota Optimal Drive is the new Valvematic engine line-up. Across the range these achieve a reduction in CO₂ emissions and fuel consumption of between 10 and 26 per cent, while at the same time increasing power by between three and 20 per cent, compared to the engines used by the previous generation Avensis.

Valvematic is an innovation based on Toyota's proven dual Variable Valve timing – intelligent (dual VVT-i) technology. In addition to the variable timing of the inlet and outlet valves, Valvematic adds a lift control system that continuously varies the lift of the inlet valves to better control the volume and speed of the intake airflow. This provides a breakthrough in combustion efficiency that ultimately delivers more power for less fuel.

Compact and simple design

The two basic elements of the Valvematic system are an actuator and a continuous valve lift control unit.

The opening motion of the inlet valves is transferred from the camshaft to the valves by a rocker. To control the amount the valve is opened, the continuous valve lift control unit varies the clearance between the valve and the rocker.

Compact and positioned on the end of the cylinder head, the Valvematic actuator uses a screw thread mechanism to adjust the clearance and contact period between the rocker and valve. As a result, Toyota has been able to package the Valvematic operating system within the cylinder head, without having to increase the height or width of the engine.

Fewer restrictions for efficient combustion

Control of the valve lift height allows even more precise control of the airflow, compared to VVT-i engines. Valvematic also enables other parts of the engine to be engineered for higher efficiency. Together, these measures help reduce the restrictions that limit the efficiency of conventional petrol engines, leading to four tangible benefits.

BENEFIT	MECHANICAL CAUSE	Engine speed range	COMPARISON	
			Valvematic	outgoing VVT-i
Increased fuel efficiency	Throttle valve fully opened	Low to Medium	⊙	△
		Medium to High	○	○
	Reduced mechanical friction	Low to Medium	⊙	△
		Medium to High	⊙	⊙
Lower emissions	Faster airflow	Low to Medium	⊙	○
		Medium to High	⊙	⊙
Increased power	Higher valve lift	Low to Medium	⊙	○
		Medium to High	⊙	○
	Variable length of intake manifold	Low to Medium	⊙	⊙
		Medium to High	⊙	△
Better engine response	Throttle valve fully opened	Low to Medium	⊙	△
		Medium to High	⊙	○

High efficiency ⊙
 Good efficiency ○
 Less good efficiency △

Increased fuel efficiency

One of the limiting forces in a conventional internal combustion engine is the so-called “pumping loss”. This is caused by a vacuum created in the air intake manifold at low to medium engine speeds, when a reduced air-fuel mixture is needed. At these speeds the throttle is partially open and a vacuum is created in the manifold as the air-fuel mixture fills the combustion chamber.

The piston therefore has to work continuously against this vacuum, reducing the engine’s efficiency. On Valvematic engines, the valve lift height is variable, so in the low to medium engine speed range the air-fuel mixture can be controlled by the lower lift height of the valves, practically leaving the throttle fully open, which reduces the pumping loss.

Controlling the air-fuel mixture by a lower lift height at these engine speeds also reduces mechanical friction, another advantage that helps save fuel. Each valve is positioned with a spring, to which a force is applied to open the valve. On a conventional petrol engine the valve is continually opened to its maximum lift at every engine revolution, but with the Valvematic system the amount of lift is varied according to engine speed or load, so the energy required to open the valve is reduced.

Lower emissions

The key to combustion efficiency – delivering more power from less fuel and so achieving lower emissions – is to achieve the best possible air-fuel mixture as it enters the combustion chamber.

If the air intake speed is too low, the air and fuel cannot mix fully, meaning lower combustion efficiency and higher emissions for a given power output. The principle of the Valvematic system is to control both the speed and volume of the air-fuel mixture by varying the inlet valve lift and duration.

At low to medium engine speeds when air intake speed is usually lower, the Valvematic system only partially opens the inlet valve. This means that for a given volume flow, the air and fuel mixture has to pass faster through the smaller valve opening. This creates a faster airflow and the mixing of the air and fuel is optimised, dramatically improving combustion efficiency and reducing emissions. As most everyday driving is within this engine speed range, this brings a significant improvement in real-world performance.

Increased power

The continuous valve lift control unit not only allows for a lower lift height in normal driving conditions, it also permits increased lift height when maximum power is required. With the higher valve lift it is possible to maximise the volume of air and fuel entering the combustion chamber, resulting in a higher overall power output.

To further optimise combustion efficiency, Toyota has designed a variable length inlet manifold. In the low to medium engine speed range, a valve in the manifold is kept closed, causing the air to take a longer route. This route is designed to serve as an accelerator, ensuring the airflow speed is maximised as it approaches the inlet valve, further improving combustion efficiency. At higher engine speeds the valve is opened, allowing air to enter via a shorter, less restrictive route. This maximises the volume of air able to reach the engine, ultimately increasing power output.

Better engine response

As the volume of air and fuel entering the engine is controlled by the opening of the inlet valve, the traditional role of the throttle has changed. Instead of controlling the airflow into the engine at all times, it is now mainly used to restrict airflow at engine shut-down, or as part of the Vehicle Stability Control system.

This means that for the most part the throttle can be held fully open when the engine is running, minimising restriction and so maximising airflow efficiency into the inlet

manifold. This in turn improves engine response, as there is no longer a delay in the air reaching the engine when the throttle is opened.

Toyota Optimal Drive 1.8-litre Valvematic

The new 1.8-litre Valvematic offers a choice of a new six-speed manual transmission or new Multidrive S, Toyota's latest continuously variable transmission technology. Power is greater by 14 per cent compared to the previous 1.8 VVT-i unit at 145bhp (147 DIN hp) and there is an extra 10Nm of torque, with a maximum 180Nm delivered at 4,000rpm. CO₂ emissions are down 10 per cent at 154g/km in the saloon with manual gearbox; 16 per cent at 157g/km with Multidrive S.

Toyota Optimal Drive 2.0-litre Valvematic

The 2.0-litre Valvematic is at the top of the petrol engine range, offered with six-speed manual and Multidrive S transmissions. Maximum output is 150bhp (152 DIN hp), three per cent higher than Toyota's 2.0-litre D4 engine, and maximum torque is 196Nm, produced at 4,000rpm. With manual transmission, CO₂ emissions are 15 per cent lower at 163g/km; with Multidrive S the reduction is even greater – down 26 per cent to 164g/km.

With the benefit of these new engines, Toyota delivers a class-leading power to CO₂ ratio.

Upgraded diesel engines with more torque and lower emissions

- Increased torque at lower engine speeds
- Next-generation common rail and piezoelectric injector technology
- High injection pressure – 2,000 bar
- 2.2 D-4D 150 and 2.2 D-CAT engines meet Euro V standards

The benefits of Toyota Optimal Drive are also evident in the revised diesel engine line-up. The challenge was to develop these engines to give excellent performance and low CO₂ emissions and fuel consumption, while at the same time achieving a substantial reduction in the level of particulate matter (PM) and nitrous oxides (NO_x) emissions. The Toyota Optimal Drive 2.2-litre D-4D 150 and 2.2-litre D-CAT engines all meet Euro V emissions standards.

New Avensis offers customers one of the most comprehensive ranges of diesel engines in the D-segment, all of them benefiting from Toyota Optimal Drive technology. Entry point is the 2.0-litre D-4D 130, followed by the 2.2-litre D-4D and D-CAT 150 as mid-power options, and the 2.2 D-CAT 180 as the higher power unit.

A series of component systems has been re-engineered on all three engines to achieve higher performance with lower emissions and fuel consumption. There is also more torque at lower speed (improved by up to 5.5 per cent according to engine), which means less frequent gear changes and more driving pleasure.

The solenoid injectors on the D-4D 130 and D-4D 150 engines have been replaced with the latest, more efficient piezoelectric type, while the D-CAT 180, which already used the technology, now benefits from the upgraded version. The piezoelectric injectors control fuel volume and injection timing more accurately and, combined with higher injection pressure, give a shorter injection time. Toyota's piezoelectric common rail system has one of the highest injection pressures in systems of this type, 2,000 bar.

This state-of-the-art technology is a central factor in achieving class-leading levels of power and torque with high fuel efficiency. The more refined control of the fuel injection provided by the injectors helps cut emissions of CO₂ and other pollutants, including PM and NO_x, and reduce fuel consumption. This is also aided by a new combustion chamber shape that optimises the combustion process and by use of low viscosity oil to reduce friction.

Together the new diesel engine technology features deliver a reduction in CO₂ and fuel consumption levels between one and 10 per cent compared to the previous generation Avensis.

Toyota Optimal Drive 2.0-litre D-4D 130

The entry-level 2.0-litre D-4D 130 engine delivers power through a six-speed manual transmission and produces 124bhp (126 DIN hp) at 3,600rpm and 310Nm of torque between 1,800 and 2,400rpm. Emissions are down seven per cent at 134g/km for the saloon (TR grade), with improved performance. At this level of CO₂ output, company car drivers enjoy considerable savings in Benefit-in-Kind (BIK) taxation, without having to compromise specification, styling, performance or driving pleasure. Unlike its principal competitor manufacturers, Toyota does not confine these benefits to a

niche version in the model line-up, but makes them available in its core feature model, Avensis TR.

Toyota Optimal Drive 2.2-litre D-4D 150

The 2.2 D-4D 150 offers a strong balance of power and economy. Output of 148bhp (150 DIN hp) is reached at 3,600rpm, and maximum torque, increased by nearly 10 per cent to 340Nm, is generated between 2,000 and 2,800rpm. This wide torque range means optimum torque is available in most driving conditions, cutting the need for frequent gear changes. In spite of the improved performance, CO₂ emissions are cut by six per cent to 147g/km (Avensis saloon).

Toyota Optimal Drive 2.2-litre D-CAT 180

The top-of-the-range diesel, the 2.2 D-CAT 180 has a unique combination of a low compression ratio and a high boost turbocharger, which gives remarkable power and engine efficiency. It features the most advanced technologies available today, including an all-aluminium construction, high pressure piezoelectric common rail injection system, electrically activated turbocharger, latest-generation ceramic glow plugs and Toyota D-CAT.

With 175bhp (177 DIN hp) and 400Nm of torque across a rev band from 2,000 to 2,800rpm, it is among the most powerful diesel engines in the D-segment. Nought to 62mph acceleration is achieved in 8.5 seconds, yet CO₂ emissions are just 157g/km for the saloon, making it one of the cleanest high power diesels on the market.

Toyota Optimal Drive 2.2-litre D-CAT 150 with automatic transmission

For the first time in an Avensis, a diesel engine will be offered with the option of a new six-speed automatic transmission, available from spring 2009. This gives a fast shift response while maintaining comfortable performance by eliminating shift-shock. The system includes a sequential manual mode: by moving the shift level to the M gate, the driver can choose to select gears using the shift lever or paddle shifts on the steering wheel.

The 2.2-litre D-CAT 150 automatic comes with an output of 148bhp (150 DIN hp) and maximum torque of 340Nm. The engine benefits from Toyota D-CAT clean diesel technology and achieves CO₂ emissions of 169g/km (Avensis saloon). D-CAT, a technology unique to Toyota, simultaneously reduces NO_x and PM emissions

through a maintenance-free four-way DPNR catalyst system designed to last the lifetime of the vehicle.

Engines and transmissions made in Europe

Toyota Motor Manufacturing UK's (TMUK) plant in Deeside, North Wales, is supplying the 1.8 Valvematic petrol engine for new Avensis and also a 1.6 Valvematic that is available in European markets, but is not planned for sale in the UK. The Toyota Motor Industries Poland (TMIP) factory in Jelcz-Laskowice will supply 2.0 and 2.2 diesel engines and Toyota Motor Manufacturing Poland (TMMP) is responsible for the new six-speed manual transmission used with the Valvematic engines.

Advanced new transmissions

New Avensis has a range of advanced transmissions with a focus on a balance between responsiveness, smoothness and, of course, fuel efficiency.

Multidrive S, Toyota's new and highly advanced continuously variable transmission (CVT) is available with the 1.8 and 2.0-litre Valvematic petrol engines. And for the first time on a Toyota diesel passenger car, a six-speed automatic will be available, offered on the 2.2-litre D-CAT 150 from spring 2009.

All petrol engines are fitted with a newly developed six-speed manual transmissions, while the diesel engines are matched to the proven six-speed manual gearbox featured in the previous generation Avensis.

New Multidrive S

- Powerful driving performance with smooth, refined shift
- Convenience of an automatic with CO₂ emissions and fuel efficiency similar to those from a manual gearbox
- Seven-speed sequential mode

Multidrive S gives a very smooth, refined shift action, automatically optimising torque and fuel consumption by always using the ideal engine speed. Where conventional automatic and manual transmissions use multiple sets of gears and a clutch to achieve different gear ratios, Multidrive S delivers an infinite number of ratios by using two cone-shaped pulleys and a high-strength V-shaped steel belt. With this

arrangement it changes ratios smoothly and seamlessly, almost eliminating shift-shock.

Multidrive S is highly fuel-efficient because the continuously variable transmission lets the engine work at its most efficient speed, optimising engine torque performance. Thanks to the innovative pulley and chain V-belt design, it can continuously maintain the ideal ratio to keep the engine within its optimum power range. The very smooth, refined shift automatically optimises torque and fuel consumption, by always using the optimum engine speed.

The system continuously and seamlessly adjusts the pulley ratio to provide the most fuel efficient ratio under normal driving conditions. When the engine is pressed a little harder, the transmission simulates the behaviour of a seven-speed automatic, which helps eliminate the characteristic whining associated with CVTs under hard acceleration. When triggering a kick-down with the accelerator, the transmission returns to its normal operation to gain the full benefit from the power range.

An uphill/downhill control logic selects the best ratios for smooth performance when driving on gradients. When driving uphill, the ratio reduces the amount of gear shifting required, while on downhill stretches ratios are selected to make the best use of engine braking.

The transmission's Sport mode gives a sportier drive, selecting a more responsive and power-maximising ratio in line with driver input. And for an even more involving drive, the system has a seven-speed sequential manual mode, letting the driver change gear using the shift lever or, exclusively on the 2.0 Valvematic, paddle shifts mounted on the steering wheel.

The paddle shifts can also be used to temporarily override the automatic D-mode when required, for example when preparing an overtaking manoeuvre. The transmission will return to automatic mode when the "+" paddle is pressed for more than a second; when a constant driving speed is maintained; when acceleration is constant over a specified period of time; or when the vehicle comes to a complete stop.

New six-speed manual transmission for all petrol engines

- Wider gear ratio range reduces engine revs for better fuel economy and lower CO₂ emissions
- Smoother gear shifting with improved shift feel

Using a wider range of gear ratios in the new six-speed manual gearbox permits a reduction in engine speed, which in turn leads to better fuel economy and lower CO₂ emissions. New Avensis petrol engines are now all fitted as standard with a six-speed transmission, replacing the five-speed unit used in the previous generation model. Fuel economy has also been improved by reducing friction and drag in the transaxle. An oil separator has been added to reduce the level of oil stir and low friction bearings and low viscosity oil have been specified.

A great deal of engineering effort has been invested in improving shift feel in the new gearbox. In the synchronising system a high-capacity synchroniser has been adopted, the width of the teeth (or pitch) has been increased from 2.1 to 1.6 and a separate chamfer has been added, giving one for synchronising and one for engaging. A highly efficient shift layout and a steel fork with symmetrical rigidity were also specified.

It is the first time all three of these refinements have been introduced in the same Toyota gearbox and together these changes achieve a breakthrough in smooth performance compared to the previous generation Avensis.

Computer Aided Engineering methods were used to achieve the best possible noise and vibration performance. High-strength oval and conical forms were developed and computational work produced an optimised case shape, bearing support and strengthening rib layout. Tooth geometry was also perfected and a new grinding process used for creating teeth on the third, fourth and final drive gears.

New six-speed automatic transmission for 2.2 D-CAT 150

- Compact and extremely smooth
- AI-SHIFT control optimises shift patterns to suit road conditions and driving style
- “Sport direct shift response” for six-speed sequential M-mode
- Paddle shift and “blipping” on downshifts for more driving fun and feel
- Available from spring 2009

A brand new six-speed automatic transmission will be available with a 2.2 D-CAT 150 engine, a first for a Toyota diesel passenger car. It provides smooth shift response while maintaining a high level of comfort by eliminating harsh shift shocks. AI-SHIFT Control (Artificial Intelligence Shift Control) selects a shift pattern that corresponds to road conditions and the driver's individual driving style, monitoring throttle opening angle, braking inputs and vehicle and engine speed, and automatically adjusting the shift pattern to suit. The transmission also has a Sport mode that triggers a more aggressive shift pattern, again using AI-SHIFT Control.

The transmission also offers a more involving driving experience with a sequential six-speed mode. By moving the shift lever into the M-gate, the driver can make sequential gear shifts using the lever, or paddles mounted on the steering wheel.

Toyota engineers added a newly developed M-mode control, "Sports direct shift response." M-mode gives a more direct feel, with lock-up used on second to sixth gears for as wide an engine speed range as possible, right up to the red line, giving a sporty drive like that provided by a manual transmission. The paddle shift option and "blipping" effect on downshifts add even more driving pleasure. Blipping is achieved by controlling the injection volume of fuel and hydraulically controlling engagement and disengagement of the clutch, enabling a great improvement in change time and response. With this feature Toyota has achieved a world-best for downshift times with diesel engines.

As with the Multidrive S transmission on the 2.0-litre Valvematic engine, the Avensis 2.2 D-CAT 150 lets the driver temporarily override the D-mode. The gearbox remains in D-mode, but to prepare the car for overtaking or cornering, a lower gear can be temporarily selected. This feature can also be used when engine braking is needed.

This function selects a fixed highest gear range mode and holds it until it detects the vehicle has stopped, a constant speed or acceleration has been maintained for specified length of time, or the driver has pressed the "+" paddle for more than a second.

The gearbox is 384mm long and weighs 94.5kg, including liquids. As well as giving very smooth, shock-free shifts, it is very responsive – another example of how Toyota has successfully resolved very different performance requirements. Even take-off

control (from standstill) is well-balanced, quick and without hesitation or shock, adding to ride comfort.

Engineering efforts were also focused on improving shift quality. An advanced electromagnetic linear solenoid is used for more accurate control of large oil flows in the clutch and software was developed for engine torque demand control and multiple shift sequence logic. Closer ratio gearing was also adopted, aiding improved acceleration performance in the middle to low vehicle speed range.

Fuel economy was optimised by changing the groove shape on the friction discs in the torque converter. Re-engineering the torque converter yields a 90 per cent level of efficiency. Thanks to these changes, the torque converter is able to operate down to as low as 1,000rpm. Toyota also increased the fuel cut duration during deceleration, further increasing fuel economy.

Proven six-speed manual transmission for diesel Avensis

- Robust, but exceptionally compact – just 384mm long
- Low viscosity oil for lower CO₂ emissions and fuel consumption

The Toyota Optimal Drive diesel engines are matched to a six-speed manual transmission that delivers smooth, quick and precise gear changes. The gearbox's construction is not only robust, but also exceptionally compact: at just 274mm long it is shorter than all other six-speed transmissions with identical or lesser torque capacity.

For new Avensis the gearbox adopts the lowest viscosity oil available for manual transmissions, keeping CO₂ emissions and fuel consumption down.

The transmission, already proven in the previous generation Avensis, was developed to offer a very wide gear range ratio, made possible by the six-speed configuration and the adoption of a different length between the input shaft and each of the output shafts.

Dynamic handling with superior ride comfort

- New, stiffer platform for dynamic yet comfortable ride
- Improved stability, agility, ride comfort and steering feel

- Very low drag coefficient – 0.28 for saloon, 0.29 for tourer
- Reduced noise, vibration and harshness (NVH) levels

New Avensis has been engineered for smooth ride comfort, but with dynamic handling for rewarding driving characteristics.

A new platform provides an excellent balance of high-speed stability and low speed agility. To enhance performance, both the MacPherson strut front suspension and the double wishbone rear suspension have been re-engineered with improvements in torsional stiffness and roll rigidity. Front shock absorber and rear lateral force steer specifications have also been upgraded.

New, large diameter wheels with wider tyres are fitted to further enhance stability and dynamic handling. A flush underfloor design aids high speed stability, reduces noise and contributes to fuel efficiency through improved aerodynamics.

New Avensis's precise and flexible responsiveness is built on the strong foundations of a new, precision-welded platform of exceptional rigidity and a car body with excellent aerodynamics. This new platform is fundamental to the car's handling and also contributes greatly to its safety and quiet running. High tensile steel accounts for much of the constituent steel body components, which helps reduce weight, increase rigidity and ensure superb collision safety performance.

Creating a dynamic, yet comfortable ride

The main focus of Toyota's suspension and chassis engineers was on creating a car that is not only dynamic and fun to drive, but one that is also smooth and relaxing on long journeys. Their aim was to develop a car with highly competitive handling characteristics, with a very high level of comfort.

Improving stability, agility, ride comfort and steering feel

The Chief Engineer chose four key words to inform the chassis development process. With input from extensive testing on the track and on normal roads, three years were spent developing and honing new Avensis.

1. Stability

For straight-line stability, Toyota aimed to achieve the most relaxing drive possible. Drivers will notice this most on motorways, where minimal steering input is required.

On snow-covered roads the quality is even more apparent – the reason why Toyota tested so extensively in northern Europe. However, as well as making the car very agile with quick response to steering inputs, it had to be sufficiently stable, too. The following measures were taken to improve stability:

- Wider front/rear track – 1,560mm/1,550mm with 16-inch wheels; 1,550mm/1540mm with 17 and 18-inch wheels.
- Larger wheel and tyre sizes – 16, 17 and 18-inch
- Front suspension with a higher caster angle for straight-line stability
- Rear suspension with improved torsional rigidity (measure of response) and lateral force steer (measure of rear grip)

2. Agility

To achieve agile performance, new Avensis had to respond quickly to steering input. Toyota engineers focused on achieving the maximum yaw rate with minimum delay after steering input, and making sure this yaw rate quickly translates into lateral acceleration of the car. The front MacPherson strut and rear double wishbone suspension were given an improved layout. For example, great effort was invested in optimising the front anti-roll bar for increased roll rigidity to generate fast, but controlled agility.

3. Ride Comfort

For optimum ride comfort, work was done to reduce the pitch angle under hard acceleration and deceleration and to reduce bounce amplitude when driving on bumpy or potholed surfaces. The front suspension's upper support structure was changed from a single to a dual path design and new shock absorbers were introduced. This led to a reduction in rubber hardness, greatly improving ride comfort with lower noise and vibration levels.

The rear suspension gained increased longitudinal compliance to reduce harshness. The upper support material is made of a high-damping rubber to reduce noise and vibration and a soft-type suspension member mounting to the body structure is adopted.

4. Steering feel

The advanced, precise Electric Power Steering (EPS) reacts extremely quickly and shows none of the fatigue tendencies that can occur with hydraulic systems. This is

best demonstrated in situations where the driver needs to make quick, sharp, continuous turns from one direction to another. The uncomfortable steering kickback that is especially noticeable when cornering sharply on a potholed surface is effectively reduced, but with a strong focus on maintaining steering feel. The timing delay from steering input to noticeable steering effect is also much improved.

Steering feel has been further improved by the adoption of a new ECU logic and a highly rigid telescopic intermediate shaft. Two special features in the power steering system enhance the quality of the steering and give it a natural feel: active return control and yaw rate feedback control. Active return control helps to regain straight-line direction after low speed cornering by adding a returning torque to the steering wheel. Yaw rate feedback control estimates the yaw rate in high-speed cornering and adds torque to reduce the movement.

Reducing noise, vibration and harshness (NVH)

New Avensis's excellent aerodynamics helps reduce noise, with low drag coefficients (Cd) of 0.28 and 0.29 for the saloon and tourer respectively. This is the result of many hours of computer simulations and real-life wind tunnel testing and extreme attention to detail. The bodywork offers little air resistance, a quality that is enhanced by exceptionally narrow gaps between the panels and minimal protrusions.

The car spent numerous hours in the wind tunnel to refine aerodynamics and test noise reduction measures. A special Toyota methodology was used whereby underfloor drag characteristics can be isolated from those of the rest of the car and studied separately. This helps the engineers develop the smoothest, flattest possible surfaces, so that even at very high speeds the car continues to generate very little wind noise and is stable to drive.

The engine is usually the largest source of noise and vibration. For this reason, great care has been taken to ensure that the engines cause minimal disturbance to the cabin. Toyota engineers focused on minimising engine friction, enhancing rotational balance and developing an innovative sound absorption bulkhead between the engine and cabin. There are even specially insulated carpets and foam mats to help achieve a peaceful ride.

Advanced soundproofing

Special sound-insulating materials surround the cabin, including high-specification laminated glass and foam injected into the body shell. Wind noise is inhibited by the detailed design elements, including external bodywork seals, a concealed frame for the doors, weather strips and door and window mouldings.

Toyota built-in quality

- Built by Toyota Motor Manufacturing UK (TMUK)
- Assembled using the legendary Toyota Production System (TPS)
- Toyota plants follow sustainable manufacturing strategy

Nothing is so good that it cannot be made better. That Toyota engineers strive for constant improvement in everything they do is not a motto or mission that hangs on the wall and is forgotten about. It is simply the way things are done. Toyota has a word for it: *kaizen*. This means “continuous improvement” in Japanese and it is the key principle that guides Toyota in its pursuit of superior, built-in quality.

This commitment to quality yields real benefits that enhance the quality feel of new Avensis. Superior quality was established by the second-generation Avensis, for example in its Euro NCAP safety test performance. Now new Avensis has been developed to give the best possible ownership experience, from the day it comes off the production line to the end of its lifecycle.

With a built-in quality feel, new Avensis aims to deliver a sense of complete confidence, confidence from knowing that car is designed and engineered with the highest standards of quality and reliability in mind.

Toyota Motor Manufacturing UK

Toyota announced its decision to establish a manufacturing operation in Europe in 1989 and Toyota Motor Manufacturing UK (TMUK) was set up in December that year.

TMUK has two plants in the UK, representing an investment totalling more than £1.75 billion since launch and employing around 4,800 people. The vehicle plant is at Burnaston in Derbyshire and engines are manufactured at Deeside in North Wales.

The first car, a Carina E, came off the Burnaston production line on 16 December 1992. Avensis replaced Carina E in 1997 and in 2003 a second-generation Avensis was launched. A second model, Corolla, was added to the factory's production in 1998, followed by a second-generation version from 2001. In 2007 Auris, the new Toyota hatchback, replaced Corolla on the Burnaston assembly line.

Processes at Burnaston include stamping, welding, painting, plastic mouldings and assembly. Deeside undertakes machining, aluminium casting and engine assembly.

From a global viewpoint, Toyota's philosophy is to localise production in order to provide customers with the products they need, where they need them. TMUK supports that view, manufacturing cars and engines for the European market.

Vehicles built in the UK maintain Toyota's worldwide reputation for quality by implementing the renowned Toyota Production System (TPS). Based on the key principles of standardisation – Just-in-Time and *Kaizen* – TPS creates a continuous production flow to meet customer demand, whenever and wherever that may be.

Total quality control is carried out using two basic principles: building in quality at every stage and continually improving quality standards. To achieve this, TMUK uses standardised work processes and visual checks to give a clear indication of current status and make it easy to identify any problems. Each team member is responsible for the quality of his or her work and aims never to pass on poor quality to the next production stage. If anything unusual is detected, team members can halt the production line. Rigorous scrutiny of key features and functions on every vehicle helps confirm both the quality of the finished product and the consistency of the production process.

Toyota's goal: a low carbon society

Speaking at the 2008 Toyota Environmental Forum in Tokyo, Toyota President Katsuaki Watanabe said: "Since it was founded more than 70 years ago, Toyota Motor Corporation has conducted its business on the guiding principle of contributing to the development of a prosperous society through the manufacture of automobiles. However, now Toyota must seek to combine the power of people and technology to help create a society that maintains a balance between corporate activities and environmental preservation."

In 2007, Toyota announced it would pursue sustainability in different areas as part of its efforts to contribute to the continued, future development of society and the planet.

Reducing running emissions is critical as they account for 80 per cent of the total produced during a vehicle's lifecycle. However, further reductions to benefit the environment can be made at the manufacturing stage. In Europe, Toyota has reduced the average energy required to build a car by 44 per cent since 2001. Emissions have been reduced by using renewable energy, including biomass and natural sources, such as solar and wind power. All Toyota's European manufacturing plants have achieved the ambitious target of delivering zero waste to landfill.

TMUK aims to minimise the environmental impact of vehicles and their manufacture. To achieve this, TMUK's environmental policy focuses on the elimination of pollution at source, a process based on "The 5 Rs"

- **Refine** (eg no CFCs, use water-based paints where possible)
- **Reduce** (eg reduce use of natural resources, such as water, gas and electricity)
- **Re-use** (99.9 per cent of Toyota packaging in Europe is re-used)
- **Recycle** (eg recycle as much material as possible – steel, water, plastics, paper, rubber, etc)
- **Retrieve energy** (eg use exhaust gases to reheat other production processes)

World class safety performance

- Engineered with the aim of a five-star rating in more stringent 2009 Euro NCAP safety assessment
- Seven airbags as standard
- Adaptive front-lighting system
- Pre-Crash Safety System and Adaptive Cruise Control
- Lane Keeping Assist and Lane Departure Warning
- Rear parking camera

Avensis has always been one of the safest cars in its segment, gaining a five-star Euro NCAP rating in its first test, back in 2003. Recent real-life accident analysis has also proved that Avensis is one of the safest cars on the road today and it was

named the safest car of 2007 by Swedish insurer Folksam in its annual rating based on actual road accidents.

With this in mind, Chief engineer Yamamoto set out to achieve the same top class safety performance with the third-generation Avensis. The aim is to achieve a top five-star rating in the more stringent Euro NCAP test programme planned for 2009.

Advanced safety was a major requirement right from the car's early development phase. Toyota engineers examined every detail: for example, the bonnet has to be designed in a way that minimises the risk of injury to pedestrians, should an accident happen. On new Avensis the bonnet has crushable bumpers that collapse in an impact, better to absorb collision force. Good visibility is an important factor in preventing accidents from happening and to this end the base of the A-pillars has been reduced in size, while maintaining their structural strength.

Active safety for full control

New Avensis is equipped with latest-generation ABS with Electronic Brakeforce Distribution (EBD) as standard. Brake Assist (BA) works with the ABS and EBD to provide maximum braking performance in emergency situations.

Steering Assist Vehicle Stability Control (VSC+) is a new feature, also fitted as standard to all models. This operates with the Traction Control (TRC) to improve vehicle traction and safety in low grip conditions, such as rain, snow, or gravel. VSC+ enhances the protection provided by conventional VSC systems by adding steering torque assist to counteract the yaw movement that occurs when the vehicle under or oversteers in reaction to an emergency. This means that in an extreme situation, the driver may sense some torque movement on the steering wheel in a given direction to compensate for the over or understeer, adding to the adjustment made by the VSC.

High passive safety protection

New Avensis is equipped as standard with seven airbags, including a driver's knee airbag, front airbags for the driver and front passenger, two front side airbags and curtain airbags front and rear.

Active front seat headrests have been introduced to reduce the risk of whiplash injuries in the event of a rear end collision. These operate automatically should a vehicle run into the back of the car with sufficient speed, moving forward and up to support the head.

The impact absorbing qualities of the body have been further improved. The principle of the construction is to protect the occupants by creating a cabin structure that is strong enough to minimise any intrusion should an accident happen. At the same time, the construction is designed to collapse in a controlled fashion to absorb impact forces. The brake and clutch pedals are designed to retract, to avoid injuring the driver in an accident.

Isofix child seat fittings are provided as standard on the rear seats. The Child Restraint System (CRS) has a top tether to prevent the child seat tipping forward in the event of an impact.

Advanced safety features

New Avensis's active and passive safety protection is raised to a higher level thanks to new high-tech features available for the first time on the model.

High-Intensity Discharge bi-xenon headlamps, Adaptive Front-light System

High-Intensity discharge (HID) bi-xenon headlamps with an Adaptive Front-Light System (AFS) are available together as an option. By monitoring vehicle speed and steering wheel rotation, AFS predicts the area in front of the vehicle that needs illumination and adjusts the angle of the headlamps accordingly, for example when entering a bend or negotiating a junction. To compensate when a heavy load is being carried in the back, the system automatically lowers the angle of the beam. It also adjusts the angle to compensate for heavy braking and acceleration.

Emergency brake signal

All versions of new Avensis are equipped with an emergency brake signal. Designed to help avoid rear-end collisions, it automatically activates flashing brake lights during emergency braking.

Pre-Crash Safety system

A new Pre-Crash Safety (PCS) system will be available as an option exclusively on the 2.2 D-CAT 150 T Spirit with automatic transmission from spring 2009. This

predicts when a collision is imminent and initiate warnings and safety systems to prevent an impact, or mitigate the consequences should the worst happen. It first warns the driver of a danger ahead and, if a crash is determined to be unavoidable, it automatically triggers the seatbelt pretensioners and applies full braking force.

Adaptive Cruise Control

Adaptive Cruise Control (ACC) works in tandem with the optional PCS system, using the same advanced technology. ACC enables the vehicle to maintain set distance from the vehicle ahead, even as that vehicle varies its speed. Once the road ahead is clear, ACC automatically returns to the pre-set cruising speed.

Lane Keeping Assist and Lane Departure Warning

Lane Keeping Assist (LKA) and Lane Departure Warning (LDW) are also features of the optional PCS system. Using a digital camera mounted above the windscreen, these functions help prevent unintentional lane changes by sounding a warning to the driver and applying corrective steering torque.

Rear parking camera

A rear parking camera is included in the premium satellite navigation system available as an option on T₄ and T Spirit versions of new Avensis. When reverse gear is engaged, real-time images of the area around the rear of the car are relayed from a rear-facing miniature video camera to the navigation display screen on the dashboard. This provides valuable help when reversing into tight parking spaces and improves safety.

Automatic door locking system

New Avensis has a locking system that automatically secures all doors when the car reaches 12mph.

Low total cost of ownership

- Lowest cumulative maintenance time in segment
- Oil Maintenance Monitoring System on all diesel engines
- Lower CO₂ emissions mean lower car tax

Total Cost of Ownership (TCO) is an important consideration for all motorists, but of particular concern to fleet managers. Toyota was determined to make its third-generation Avensis a pleasure to drive and a pleasure to own.

Segment's lowest cumulative maintenance time

New Avensis's 10,000-mile service interval optimises the component replacement cycle and reduces the cost for "not fully-used" components. It also means synthetic oil is not required, giving a further cost saving. The car uses a maintenance-free timing chain, low-cost "element" filter which only needs partial replacement (a 45 per cent cost saving) and long-life spark plugs (23 per cent cost reduction).

New Avensis capitalises on the model's established excellent record of low repair costs. Items such as headlamp mounting brackets, which are design to break on impact before the lamp unit itself is damaged; the large front bumper, which reduces potential damage to the bonnet; and the aluminium rear bumper reinforcements, have all been developed specifically to cut the cost of repairs.

A bolt-on structure within the front bumper mountings means the section can easily be removed and replaced, with no need for any cutting or welding in the event of damage.

All Avensis diesel engines adopt an Oil Maintenance Monitoring System (OMMS), which continuously checks engine conditions and determines the optimum oil change interval. Oil changes are made easier and cleaner thanks to a new draining system. The 2.2 D-4D and D-CAT engines match the 2.0 D-4D unit in terms of cumulative maintenance time after 60,000 miles at 4.2 hours – the lowest in the diesel D-segment. These engines are also able to use mineral or semi-synthetic oils, giving a cost advantage over rival engines that can only use synthetic lubricant.

An automatic tensioner means there is no need for auxiliary belt tension checks and by using lash adjusters, the valve clearances do not have to be adjusted throughout the engine's lifespan. Clutches are also now self-adjusting, ensuring the right set-up at all times. Accessory belt life has been extended and engine coolant will last up to 100,000 miles. The 2.2 D-CAT 180 engine adopts ceramic glow plugs that can last longer than metal ones thanks to their higher resistance to heat.

Excellent reliability

The quality and reliability of the Toyota Avensis have been recognised across Europe. The second-generation model recently won the *Gelber Engel* award from the German auto club ADAC for quality, and the fleet press in the UK has praised the car on several occasions: *Fleet Management* hailed Avensis as New Fleet Car of the Year in the year it was introduced, as did *Fleet Week* magazine.

Recently the second-generation Avensis won the FN50 Survey, conducted by *Fleet News*, which showed it was the best performing model in terms of reliability in the analysis of 739,000 leased vehicles in the UK.

Furthermore, the optimum balance of performance and low CO₂ emissions and fuel consumption give new Avensis a competitive advantage in terms of Vehicle Excise Duty and company car Benefit-in-Kind tax rates.

Advanced equipment levels

- Strong standard equipment level
- Four grades – T₂, TR, T₄ and T Spirit
- Hi-tech features for comfort, entertainment and safety

The high level of advanced technology features available across the new Avensis range fully reflects the positioning of the car at the “cutting edge of the D-segment,” as proclaimed by Chief Engineer Yamamoto. The specifications have been developed with input from key user groups, including fleet customers, user-chooser company car drivers and contract hire and leasing company representatives.

Entry point to the new Avensis range is T₂ grade. Key features include air conditioning, six-speaker audio system with CD and MP3 file player (from disc), heated electrically adjustable door mirrors, electric front windows, seven airbags, body coloured door handles and bumpers, electronic parking brake, a multi-information display and chrome window surround. The active safety provisions include ABS, EBD, Brake Assist (BA), and Steering Assist Vehicle Stability Control (VSC+). Security is covered by a Thatcham Category 1 immobiliser and alarm plus remote central locking with double locking and lockable glove box. An anti-hijack system automatically locks all doors when vehicle speed goes above 12mph and all locks and latches are reinforced.

TR is the feature grade, accounting for majority of new Avensis sales, and builds on the T₂ specification with the addition of 17-inch alloy wheels, front fog lights, automatic air conditioning, audio system with Bluetooth and Aux-in socket, cruise control with speed limiter (not 1.8 Valvematic with Multidrive S), automatic headlights and windscreen wipers, driver's seat power lumbar support, leather steering wheel with audio and Bluetooth switches, leather gear knob trim, titanium centre console finish, electric rear windows and, on the tourer, boot rails.

Key elements of the T₄ grade, above the TR specification, include special design 17-inch alloys, leather upholstery, auto-dimming rear view mirror, electric adjustable heated front seats and steering wheel with memory setting and Toyota's Smart Entry and Start keyless system. The T₄ tourer comes with rear privacy glass.

T Spirit is the pinnacle of the grade structure, adding 18-inch alloys in an exclusive design, rear parking sensors, a premium sound system with 11 speakers and CD changer, bi-xenon headlamps with the Adaptive Front-lighting System (AFS) and headlamp washers. The T Spirit Tourer is fitted with a panoramic roof as standard.

Premium equipment options

New Avensis owners can build on their car's specification with a wide range of high quality options.

A full-map satellite navigation system is available for TR versions, while T₄ models can be specified with a premium system which includes a high-specification audio pack with an integrated 10Gb hard drive for storing music files, and a rear parking camera.

The advanced navigation/music hard drive/parking camera features are similarly available for T Spirit models (in addition to the premium audio array fitted as standard). The T Spirit 2.2 D-CAT 150 automatic will be available with the option of the Pre-Crash Safety system from launch in spring 2009, which includes Adaptive Cruise Control (ACC) and Lane Keep Assist/Lane Departure Warning systems.

A Protection Pack is available (on TR, T₄ grades) combining the benefits of a boot liner, additional bumper protectors and rear parking sensors. For tourer versions, the

pack also provides a cargo management system which enables the boot space to be conveniently sectioned to keep different load items apart and secure.

Colours and trims

New Avensis is available in Pure White and six metallic paint finishes: Tyrol Silver, Aspen Grey, Decuma Grey, Eclipse Black, Dark Blue and Tungsten Blue. There are two black cloth upholstery designs for T₂ and TR models, with stone and black leather upholsteries for T₄ and T Spirit models.

UK pricing, VED bands and insurance groups

GRADE	POWERTRAIN	BODY	OTR PRICE	VED BAND	INSURANCE GROUP*
T ₂	Toyota Optimal Drive 1.8 Valvematic 6MT	Saloon	£16,095	D	7E/18E
T ₂	Toyota Optimal Drive 1.8 Valvematic 6MT	Tourer	£17,095	D	7E/18E
T ₂	Toyota Optimal Drive 2.0 D-4D 130 6MT	Saloon	£16,895	C	6E/18E
T ₂	Toyota Optimal Drive 2.0 D-4D 130 6MT	Tourer	£17,895	C	6E/18E
TR	Toyota Optimal Drive 1.8 Valvematic 6MT	Saloon	£17,845	D	7E/18E
TR	Toyota Optimal Drive 1.8 Valvematic Multidrive S	Saloon	£18,845	D	7E/18E
TR	Toyota Optimal Drive 1.8 Valvematic 6MT	Tourer	£18,845	D	7E/18E
TR	Toyota Optimal Drive 2.0 Valvematic Multidrive S	Tourer	£20,345	D	10E/21E
TR	Toyota Optimal Drive 2.0 D-4D 130 6MT	Saloon	£18,645	C	6E/18E
TR	Toyota Optimal Drive 2.0 D-4D 130 6MT	Tourer	£19,645	C	6E/18E
TR	Toyota Optimal Drive 2.2 D-4D 150 6MT	Saloon	£19,495	C	8E/21E
TR	Toyota Optimal Drive 2.2 D-4D 150 6MT	Tourer	£20,495	C	8E/21E
T ₄	Toyota Optimal Drive 2.0 Valvematic 6MT	Saloon	£19,845	D	10E/21E
T ₄	Toyota Optimal Drive 2.0 Valvematic Multidrive S	Saloon	£20,845	D	10E/21E
T ₄	Toyota Optimal Drive 2.0 Valvematic 6MT	Tourer	£20,845	D	10E/21E
T ₄	Toyota Optimal Drive 2.0 Valvematic Multidrive S	Tourer	£21,845	D	10E/21E
T ₄	Toyota Optimal Drive 2.0 D-4D 130 6MT	Saloon	£20,145	C	7E/18E
T ₄	Toyota Optimal Drive 2.0 D-4D 130 6MT	Tourer	£21,145	C	7E/18E
T ₄	Toyota Optimal Drive 2.2 D-4D 150 6MT	Saloon	£20,995	C	12E/25E
T ₄	Toyota Optimal Drive 2.2 D-4D 150 6MT	Tourer	£21,995	C	12E/25E
T ₄	Toyota Optimal Drive 2.2 D-CAT 180 6MT	Saloon	£21,495	D	12E/25E
T ₄	Toyota Optimal Drive 2.2 D-CAT 180 6MT	Tourer	£22,495	D	12E/25E
T Spirit	Toyota Optimal Drive 2.2 D-4D 150 6MT	Saloon	£22,995	C	12E/25E
T Spirit	Toyota Optimal Drive 2.2 D-4D 150 6MT	Tourer	£24,595	D	12E/25E
T Spirit	Toyota Optimal Drive 2.2 D-CAT 180 6MT	Saloon	£23,495	D	12E/25E
T Spirit	Toyota Optimal Drive 2.2 D-CAT 180 6MT	Tourer	£25,095	D	12E/25E

*Figures quoted are for the current 20-Group insurance rating system and the 50-Group system that will replace it from December 2010. Some insurers are already using the 50-Group ratings.

Option prices

Option	Price (inc. VAT)
Full-map satellite navigation (TR)	£1,000
Premium navigation and audio with music hard drive and rear parking camera (T ₄)	£1,500

Premium navigation with music hard drive and rear parking camera (T Spirit)	£1,000
Panoramic roof (T ₄ tourer)	£600
Protection Pack (TR, T ₄ saloon)	£450
Protection Pack (TR, T ₄ tourer)	£550
Metallic paint (all grades)	£350

TOYOTA AVENSIS TECHNICAL SPECIFICATIONS

ENGINE: Toyota Optimal Drive 1.8-litre Valvematic	
Type	2ZR-FAE
Configuration	Four cylinders in-line
Valvetrain	DOHC 16-valve Valvematic
Displacement (cc)	1,798
Bore x stroke (mm)	80.5 x 88.3
Compression ratio	10.5:1
Max. power (bhp/DIN hp @ rpm)	145/147 @ 6,400
Max. torque (Nm @ rpm)	180 @ 4,000
ENGINE: Toyota Optimal Drive 2.0-litre Valvematic	
Type	3ZR-FAE
Configuration	Four cylinders in-line
Valvetrain	DOHC 16-valve Valvematic
Displacement (cc)	1,986
Bore x stroke (mm)	80.5 x 97.6
Compression ratio	10.0:1
Max. power (bhp/DIN hp @ rpm)	150/152 @ 6,200
Max. torque (Nm @ rpm)	196 @ 4,000
ENGINE: Toyota Optimal Drive 2.0-litre D-4D 130	
Type	1AD-FTV
Configuration	Four cylinders in-line
Valvetrain	DOHC 16-valve, common rail injection
Displacement (cc)	1,998
Bore x stroke (mm)	86.9 x 86.0
Compression ratio	15.8:1
Max. power (bhp/DIN hp @ rpm)	124/126 @ 3,600
Max. torque (Nm @ rpm)	310 @ 1,800 – 2,400
ENGINE: Toyota Optimal Drive 2.2-litre D-4D 150	
Type	2AD-FTV
Configuration	Four cylinders in-line
Valvetrain	DOHC 16-valve, common rail injection
Displacement (cc)	2,231
Compression ratio	15.7:1
Bore x stroke (mm)	86.0 x 96.0
Max. power (bhp/DIN hp @ rpm)	148/150 @ 3,600
Max. torque (Nm @ rpm)	340 @ 2,000 – 2,800
ENGINE: Toyota Optimal Drive 2.2-litre D-CAT 150	
Type	2AD-FHV
Configuration	Four cylinders in-line
Valvetrain	DOHC 16-valve, common rail injection
Displacement (cc)	2,231
Compression ratio	15.7:1
Bore x stroke (mm)	86.0 x 96.0
Max. power (bhp/DIN hp @ rpm)	148/150 @ 3,600

Max. torque (Nm @ rpm)		340 @ 2,000 – 2,800							
ENGINE: Toyota Optimal Drive 2.2-litre D-CAT 180									
Type		2AD-FHV							
Configuration		Four cylinders in-line							
Valvetrain		DOHC 16-valve, common rail injection							
Displacement (cc)		2,231							
Bore x stroke (mm)		86.0 x 96.0							
Compression ratio		15.7:1							
Max. power (bhp/DIN hp @ rpm)		175/177 @ 3,600							
Max. torque (Nm @ rpm)		400 @ 2,000 – 2,800							
TRANSMISSION									
Type		6MT 1.8 Valvematic		6MT 2.0 Valvematic		6MT D-4D 130	6MT D-4D 150/ D-CAT 180	6AT D-CAT 150	
Gear ratios	1 st	3.538		3.538		3.818	3.538	3.300	
	2 nd	1.913		2.047		1.913	1.913	1.900	
	3 rd	1.310		1.375		1.218	1.218	1.420	
	4 th	0.971		1.025		0.860	0.880	1.000	
	5 th	0.818		0.875		0.790	0.809	0.713	
	6 th	0.700		0.733		0.673	0.673/ 0.638	0.608	
	Reverse	3.333		3.545		4.139	3.831	4.148	
		Multidrive S 1.8 Valvematic				Multidrive S 2.0 Valvematic			
Forward	2.386 – 0.411				2.396 – 0.428				
Reverse	2.505				1.668				
BRAKES				Valvematic and 2.0 D-4D engines			2.2 D-4D and D-CAT engines		
Front – diameter x thickness (mm)				Ventilated discs 295 x 26			Ventilated discs 320 x 26		
Rear – diameter x thickness (mm)				Solid discs 290 x 11			Solid discs 290 x 11		
Additional features				ABS, EBD, BA, VSC+, TRC					
STEERING									
Type		Rack and pinion							
Ratio		14.5:1							
Turns lock to lock		2.9							
Min. turning radius – tyre (m)		5.4							
Additional feature		Electric Power Steering							
SUSPENSION									
Front		MacPherson strut							
Rear		Double wishbone							
PERFORMANCE									
Engine		1.8 Valvematic		2.0 Valvematic		2.0 D-4D 130	2.2 D-4D 150	2.2 D-CAT 150	2.2 D-CAT 180
Transmission		6MT	MDS	6MT	MDS	6MT	6MT	6AT	6MT
Max speed (mph)									
Saloon		124	124	127	127	124	131	127	137
Tourer		124	124	124	124	124	131	127	137
0-62mph (sec)									
Saloon		9.4	10.4	9.0	10.0	9.7	8.9	9.5	8.5

Tourer		9.7	-	9.3	10.7	10.0	9.2	9.8	8.8
Fuel consumption (mpg)									
Urban	Saloon	33.2	32.8	31.0	30.7	43.5	40.4	33.6	38.2
	Tourer	32.8	-	30.7	30.7	42.8	39.8	32.9	37.7
Extra-urban	Saloon	52.3	50.4	50.4	49.6	67.3	60.1	48.7	56.5
	Tourer	51.4	-	50.4	48.7	65.7	58.9	47.1	55.4
Combined	Saloon	43.5	42.2	40.9	40.4	55.4	51.4	41.5	47.9
	Tourer	42.8	-	40.9	40.4	54.3	50.4	40.4	47.1
Fuel tank capacity (l)		60							
EMISSIONS									
Engine		1.8 Valvematic		2.0 Valvematic		2.0 D-4D 130	2.2 D-4D 150	2.2 D-CAT 150	2.2 D-CAT 180
Transmission		6MT	MDS	6MT	MDS	6MT	6MT	6AT	6MT
Carbon dioxide (g/km)									
Urban	Saloon	199	201	215	215	173	185	216	197
	Tourer	198	N/A	216	216	174	189	223	200
Extra-urban	Saloon	127	131	133	134	111	124	141	134
	Tourer	128	N/A	134	136	115	128	145	136
Combined	Saloon	154	157	163	164	134 (TR) 135	147 149 (T spirit)	169	157 159 (T Spirit)
	Tourer	155	N/A	164	165	136	150 152 (T Spirit)	174	160 163 (T Spirit)
Carbon monoxide (CO, g/km)		0.21	0.24	0.34	0.19	0.23	0.161	tbc	0.141
Hydrocarbons (HC, g/km)		0.03	0.04	0.03	0.04	-	-	-	-
Nitrogen oxides (NOx, g/km)		0.02	0.01	0.01	0.01	0.14	0.162	tbc	0.105
HC + Nox (g/km)		-	-	-	-	0.16	0.171	tbc	0.118
Particulates (PM, g/km)		-	-	-	-	0.014	0.001	tbc	0.001
VED Band		D	D	D	D	C	C	E	D
Euro Class		4	4	4	4	4	5	5	5
DIMENSIONS				Saloon			Tourer		
Overall length (mm)				4,695			4,765		
Overall width (mm)				1,810					
Overall height (mm)				1,480					
Wheelbase (mm)				2,700					
Track – front (mm)				1,560 (16in wheel) 1,550 (17/18in wheel)					
Track – rear (mm)				1,550 (16in wheel) 1,540 (17/18in wheel)					
Front overhang (mm)				965					
Rear overhang (mm)				1,030			1,100		
Drag coefficient (Cd)				0.28			0.29		

VDA luggage capacity – rear seat up (l)				509				543	
VDA luggage capacity – rear seat down (l)				n/a				1,609	
Luggage compartment	Length – rear seat up (mm)			960				1,105	
	Length – rear seat down (mm)			1,685				1,715	
	Max. width (mm)			1,470				1,550	
	Height (mm)			530				765	
WEIGHTS									
Engine									
Engine		1.8 Valvematic		2.0 Valvematic		2.0 D-4D 130	2.2 D-4D 150	2.2 D-CAT 150	2.2 D-CAT 180
Transmission		6MT	MDS	6MT	MDS	6MT	6MT	6AT	6MT
Kerb weight (kg)	Saloon	1,370 – 1,455	1,405 – 1,475	1,400 – 1,475	1,435 – 1,505	1,490 – 1,580	1,515 – 1,600	1,530 – 1,615	1,515 – 1,610
	Tourer	1,405 – 1,510	N/A	1,420 – 1,525	1,465 – 1,560	1,520 – 1,635	1,545 – 1,635	1,560 – 1,650	1,550 – 1,650
Gross Vehicle Weight (kg)	Saloon	2,000	2,020	2,020	2,050	2,100	2,140	2,140	2,140
	Tourer	2,000	N/A	2,020	2,050	2,100–2,300	2,140	2,140	2,140
Towing capacity – braked (kg)		1,500	1,600	1,500	1,800	1,600	1,800	1,600	1,800
Towing capacity – unbraked (kg)		500							

TOYOTA AVENSIS EQUIPMENT SPECIFICATION

SAFETY	T2	TR	T4	T SPIRIT
Driver and front passenger airbags	✓	✓	✓	✓
Front side airbags	✓	✓	✓	✓
Driver's knee airbag	✓	✓	✓	✓
Full-length curtain shield airbags	✓	✓	✓	✓
Passenger front airbag cut-off switch	✓	✓	✓	✓
Isofix child seat mounts on rear seats	✓	✓	✓	✓
Five three-point seatbelts with Emergency Locking Retractor	✓	✓	✓	✓
Front and rear seatbelt fastening reminder system	✓	✓	✓	✓
ABS with Electronic Brakeforce Distribution and Brake Assist	✓	✓	✓	✓
Steering Assist Vehicle Stability Control (VSC+) and Traction Control (TRC)	✓	✓	✓	✓
Active front head restraints	✓	✓	✓	✓
High-Intensity Discharge bi-xenon headlamps with Adaptive Front-lighting System (AFS)	x	x	x	✓
Pre-Crash Safety System with Pre-crash warning, Adaptive Cruise Control, Lane Keep Assist and Lane Departure Warning	x	x	x	Opt (D-CAT 150 auto)
Automatic door locking	✓	✓	✓	✓
Emergency brake signal	✓	✓	✓	✓
Active high level stop lamp	✓	✓	✓	✓
INSTRUMENTS & CONTROLS				
Multi-information display	✓	✓	✓	✓
Optitron instrumentation	✓	✓	✓	✓
Cruise control with speed limiter (n/a 1.8 Multidrive S)	x	✓	✓	✓
Rain-sensing windscreen wipers	x	✓	✓	✓
Dusk-sensing headlights	x	✓	✓	✓
Electronic parking brake	✓	✓	✓	✓
COMFORT & CONVENIENCE				
Manual air conditioning	✓	x	x	x
Automatic dual-zone air conditioning	x	✓	✓	✓
Electric front windows	✓	✓	✓	✓
Electric rear windows	x	✓	✓	✓
Electrically adjustable heated door mirrors	✓	✓	✓	✓
Electrically retractable door mirrors	x	x	✓	✓
Smart Entry and Start	x	x	✓	✓
Electrochromic auto-dimming rear view mirror	x	x	✓	✓
Remote boot release	✓	✓	✓	✓
Rear parking sensors	x	x	x	✓
Rear parking sensors/boot liner/bumper protectors (plus cargo management system for tourer)	x	Opt	Opt	x
AUDIO & NAVIGATION				

6-speaker audio system with radio, CD and MP3/WMA file playing from disc	✓	✓	✓	✗
AUX-in socket for MP3 player connection	✓	✓	✓	✓
Bluetooth	✗	✓	✓	✓
11 speaker premium audio system with CD changer	✗	✗	✗	✓
Full-map satellite navigation	✗	Opt	✗	✗
Premium satellite navigation with audio upgrade, 10Gb music hard drive and rear parking camera	✗	✗	Opt	✗
Premium satellite navigation with 10Gb music hard drive and rear parking camera	✗	✗	✗	Opt
SECURITY				
Remote central locking with double locking	✓	✓	✓	✓
Thatcham Category 1 alarm and immobiliser	✓	✓	✓	✓
Lockable glovebox	✓	✓	✓	✓
SEATING, UPHOLSTERY AND TRIM				
Manually adjustable front seats	✓	✓	✗	✗
Electrically adjustable heated front seats and steering wheel with memory setting	✗	✗	✓	✓
Electric lumbar support on driver's seat	✗	✓	✓	✓
Cloth upholstery	✓	✓	✗	✗
Leather upholstery	✗	✗	✓	✓
One-touch flat-folding rear seats	✓	✓	✓	✓
Four underfloor storage boxes (tourer)	✓	✓	✓	✓
Leather steering wheel and gear knob trim	✗	✓	✓	✓
EXTERIOR				
Front fog lights	✗	✓	✓	✓
Colour keyed door handles and mirrors	✓	✓	✓	✓
Rear privacy glass (tourer)	✗	✗	✓	✓
16-inch steel wheels	✓	✗	✗	✗
17-inch alloy wheels	✗	✓	✓	✗
18-inch alloy wheels	✗	✗	✗	✓
Panoramic roof (tourer)	✗	✗	Opt	✓