

YARIS HYBRID

(third generation Yaris range)

This press pack accompanied the European launch of the first Yaris Hybrid, an addition to the third generation Yaris range, in May 2012. The model and the Yaris range underwent changes during its time on sale. These can be tracked using the Timeline feature on the Yaris archive web page. Further information and assets can be obtained from the Toyota press office.

THE NEW YARIS HYBRID

- A flagship for Toyota's best-selling model in Europe
- The only full hybrid in the supermini B-segment
- Clever repackaging of Hybrid Synergy Drive delivers great fuel efficiency and low emissions with no compromise in cabin and load space
- Bringing Toyota full hybrid technology to a wider customer base than ever before
- Yaris exclusive among its competitors in offering three powertrain options: petrol, diesel and now full hybrid
- Toyota now producing full hybrid models at two European factories

The new Yaris Hybrid is Europe's first full hybrid supermini hatchback. Flagship of the Yaris range, it's a compelling proposition in the region's highest volume market segment and will open up the benefits of full hybrid technology to wider customer base than ever before.

Yaris is Toyota's best-selling core model in Europe, with more than 2.5 million units sold since the first generation model was introduced in 1999, 368,000 of them in the UK. With its latest development it becomes the only car in the B-segment to offer the option of three types of powertrain: petrol, diesel and full hybrid.

The new model combines the ingenious packaging and urban agility of Yaris with the smooth, refined driving quality and efficiency of Toyota Hybrid Synergy Drive to mark a major step forward in the company's European strategy for the introduction of full hybrids across its model range.

With high fuel efficiency, low environmental impact, strong acceleration, great manoeuvrability and EV capability, it is ideally suited for urban driving.

Toyota has comprehensively revised its full hybrid powertrain so that it can be installed in Yaris without diminishing the system's quality and performance, or reducing the size of the passenger accommodation and loadspace. The downsized hybrid system combines a substantially re-engineered 1.5-litre petrol engine with a lighter, more compact electric motor, transaxle, inverter and battery pack. It offers a best-in-class balance of performance, fuel economy and CO₂ emissions: official combined cycle fuel consumption is 80.7mpg (76.3 for T Spirit); CO₂ output is a segment-best 79g/km (85g/km for the T Spirit, still well below the UK's 100g/km VED threshold); and the ability to operate in all-electric EV mode allows for frequent running with zero NO_x, particulate or CO₂ tailpipe emissions.

These qualities further strengthen Yaris as an ideal choice for urban motoring, particularly as fuel prices continue to nudge record high levels. Toyota's internal test data show that Yaris Hybrid can cover a high proportion of urban journey times and distances with its petrol engine switched off, which means more money saved at the pumps.

Toyota does not consider Yaris Hybrid to be a niche model, expecting it to claim 20 per cent of annual European Yaris sales. It represents a strong alternative for urban motorists who want a new driving and ownership experience.

Yaris Hybrid combines the tangible benefits of advanced technology, low emissions and low cost of ownership with particularly relaxed and quiet driving style. Its Hybrid Synergy Drive proves that driving pleasure does not have to be sacrificed for environmental responsibility and low running costs. At the same time, it shares the same high residual values as Toyota's other hybrid models.

Toyota was the first manufacturer to produce a volume hybrid model in Europe, with Auris Hybrid, built by Toyota Motor Manufacturing UK. The arrival of Yaris Hybrid, manufactured by Toyota Motor Manufacturing France, further extends its industry lead in Europe and reinforces the company's commitment to local, advanced technology manufacturing in the region.

The introduction this summer of Yaris Hybrid, together with the Prius+ seven-seat MPV and Prius Plug-in will bring Toyota's European full hybrid range up to five models by the end of the year.

Yaris Hybrid is available to order now, with customer deliveries from 1 July. The range starts at £14,995 on the road.

FULL HYBRID POWERTRAIN

- System features substantially re-engineered 1.5-litre petrol engine with downsized hybrid system components
- Compact battery, located beneath rear seats to preserve boot space
- Total system output 98bhp (74kW)
- Official urban fuel consumption 80.7mpg, CO₂ emissions 79g/km (T₃ and T₄ models)
- All-electric EV operation, with zero fuel consumption and tailpipe emissions

The new Yaris Hybrid introduces the first downsized version of Toyota's proven Hybrid Synergy Drive technology, marking a significant breakthrough in hybrid powertrain packaging.

The new powertrain has been tailored for installation in Yaris's compact and extremely space-efficient design without detracting from either system quality and performance, or the amount of space in the cabin and boot.

All of the principal hybrid components have been reduced in size and weight, and the fuel tank and hybrid battery have been installed under the rear seat. As a result, Yaris Hybrid has identical space for occupants and the same 286-litre luggage capacity as the standard petrol and diesel models.

The hybrid system combines a 1.5-litre petrol engine with a lighter, more compact electric motor, transaxle, inverter and battery pack. Total system weight is 201kg, which is 20 per cent (42kg) less than that of an Auris Hybrid.

Compact, lower capacity petrol engine

The 1,497cc, 16-valve DOHC Atkinson cycle petrol engine with VVT-i is based on the unit which powered the second generation Prius. It has been substantially re-engineered, and is 50mm (10 per cent) shorter and 17kg (17 per cent) lighter than the 1.8-litre unit featured in other current Toyota full hybrid powertrains.

The new unit generates a maximum 73bhp (55kW) at 4,800rpm and maximum torque of 111Nm from 3,600 to 4,400rpm. With a focus on achieving lower emissions and the least mechanical friction for better fuel economy, around 70 per cent of the engine's components are new or have been redesigned.

Overall, the engine's thermal efficiency has been improved by six per cent compared with that used in the second generation Prius, which contributes to better fuel efficiency and environmental performance.

New technologies have been adopted, too, including exhaust gas recirculation (EGR) and an electric water pump. The auxiliary drive belt has been dispensed with, and the engine uses a low-friction timing chain, a lightweight resin-based intake manifold and a compact exhaust manifold.

When used in combination with EGR, the Atkinson cycle engine can deliver significant gains in fuel efficiency and emissions performance. In the Atkinson cycle, compression and expansion are asymmetrical, and the inlet valves close late, delaying compression. This

creates a high expansion ratio for less compression, converting combustion energy to engine power more effectively. As a result, the exhaust temperature is lower than that of conventional engines. The EGR system reintroduces cooled exhaust gas into the intake system, further reducing engine operating temperatures.

Using an electric water pump, and a small, lightweight, multi-function radiator, both improves engine warm-up performance and reduces cooling friction loss, strengthening fuel efficiency, while doing without a mechanical pump drive belt reduces friction, again contributing to better fuel economy.

The new resin-based intake manifold, exclusive to Toyota's hybrids, is compact, lightweight and quiet, with reduced noise and vibration. The 12-hole atomising fuel injectors are highly efficient, helping keep fuel consumption and emissions down.

The exhaust system has a new, low heat capacity, maniverter-type manifold. With the catalytic converter positioned much closer to the engine exhaust port, it cuts catalyst warm-up time by 24 per cent, contributing to a marked improvement in emissions during shorter journeys.

Downsized hybrid transaxle

A new transaxle is at the heart the Hybrid Synergy Drive system in Yaris Hybrid, housing the electric motor, generator, power split device and double-motor reduction mechanism in a single, lightweight, compact transmission casing that's directly comparable in size to a conventional gearbox.

Using a smaller E-CVT electric continuously variable transmission and a more compact electric motor allows for a six per cent reduction in the length of the hybrid transaxle and a 11kg weight saving over the unit used in Auris Hybrid. This makes it the most compact hybrid transmission Toyota has yet engineered.

The new electric motor generates an immediate 45kW and 169Nm of torque. It has been made smaller and lighter by optimisation of the magnet material and the winding of the coils with flat rather than round wire. The motor cooling structure has also been improved, allowing for a smaller, yet more efficient and powerful motor.

The transaxle now incorporates a multifunctional reduction gear within the power split mechanism, and a new gear deceleration mechanism does away with the need for any chains.

Gear tooth grinding and shaving technology, similar to that used on Auris Hybrid, produces a noticeable reduction in transmission noise and vibration. These are further reduced by a new-design torsional vibration damper that helps suppress the transmission of engine vibrations.

Lubrication measures improve transaxle efficiency and minimise energy losses. A new lubrication mechanism is used in which each gear and bearing is lubricated by a combing up of the automatic transmission fluid with the rotation of the final driven gear and counter driven gear.

The split-design oil catch tank, which supplies oil for both motor/generator and gear lubrication, lowers the dynamic oil level, reducing agitation losses.

More compact hybrid battery

The downsized full hybrid powertrain also features a smaller, 144V nickel-metal hydride battery with a more efficient vehicle electric power management system.

The number of cells has been cut from the 168 in Auris Hybrid's battery to 120, made up of 20 modules connected in series. This reduces battery volume by 20 per cent and weight by 11kg, allowing the unit to be accommodated entirely beneath the rear seats, with no intrusion into the boot.

Even though the battery is smaller and lighter, its charging efficiency has been improved, with a reduction of 67 per cent in the pack state-of-charge recovery time compared to Auris Hybrid.

New power control unit with smaller inverter and converter

As there is a reduction in the hybrid system's current and voltage, the power control unit has also been made smaller and lighter, by developing a more compact inverter and switching unit.

Smaller and lighter than that fitted to Auris Hybrid, the new inverter has a new capacitor structure, reduced energy losses and better cooling, which supports improved fuel efficiency.

By optimising the layout of internal components, Toyota has also reduced the size and weight of the DC-DC converter. And the composition of the noise filter has been revised to make the unit quieter.

Compared to Auris Hybrid, the unit's output current has been reduced from 120 to 80A and output lowered from 650 to 520V, saving system energy with no loss of performance or efficiency.

Hybrid system performance

Yaris Hybrid's highly efficient powertrain generates a maximum system output of 98bhp (74kW) and offers the best balance of performance, fuel consumption and CO₂ emissions in its class. Seamless acceleration from nought to 62mph can be accomplished in 11.8 seconds and maximum speed is 103mph. Conversely official combined cycle fuel consumption of 80.7mpg and CO₂ emissions of 79g/km for the T₃ and T₄ models are segment-best (the figures for the T Spirit model are 76.3mpg and 85g/km). Drivers can make frequent use of the all-electric EV driving mode, in which the car produces no NOx, particulates or CO₂ tailpipe emissions.

Hybrid Synergy Drive in operation

Over the course of any journey, Toyota's Hybrid Synergy Drive system operates in several different modes to maximise Yaris Hybrid's overall efficiency. At rest, the engine automatically stops to save fuel, while in low efficiency conditions, such as at start-up and at low to mid-range speeds, the vehicle runs on its electric motor alone, eliminating CO₂, NOx and particulates tailpipe emissions.

In normal driving conditions, power allocation is constantly adjusted between the engine and electric motor to gain the best possible performance and fuel efficiency.

By means of an Electronically Controlled Braking system, the electric motor acts as a high-output generator during deceleration and under braking to effect regenerative braking, recovering kinetic energy that would normally be lost as heat as electrical energy for storage in the hybrid system battery.

DESIGN

- More advanced and aerodynamic design
- No compromise in Yaris's efficient packaging
- New hybrid-exclusive pearlescent paint option
- Hybrid-exclusive blue interior detailing and illumination

The current Yaris has further advanced the model's historic development concept of being compact on the outside but roomy on the inside, consistently setting new standards for clever packaging.

Yaris Hybrid inherits the same ingenious design, giving customers an appealing combination of compact exterior dimensions with a relatively spacious and practical interior.

It differentiates itself from other Yaris versions with the addition of a series of aerodynamically efficient exterior design details. Face-on it displays the stronger front-end treatment that is a signature feature in Toyota's new design language, with a larger trapezoidal lower grille. This not only improves engine bay cooling, but serves to strengthen the car's ground-hugging appearance.

The slimmer, sculpted upper grille carries the Toyota badge in hybrid blue and is flanked by slim headlights that add emphasis to the strong horizontal lines in the frontal design. The projector-type lamp units, exclusive to Yaris Hybrid, have chrome finishing with LED daytime running lights.

In profile, Yaris Hybrid is distinguished by its hybrid badging and model-specific wheel designs. It has the same cab-forward silhouette and long wheelbase as the standard Yaris, and is just 20mm longer overall – all that extra length being contained in the front overhang.

At the rear the tailgate incorporates a new LED high-mounted stop light. On T₄ and T Spirit models the clear lens combination lights feature an LED and tail lamp "signature" that is unique to Yaris Hybrid.

Yaris Hybrid is available with 15-inch aerodynamic wheel caps (T₃ grade), or 15 or 16-inch alloy wheels (T₄ and T Spirit). Eight exterior paint finishes are offered: Cirrus White, Eclipse Black (mica), Glacier Pearl (pearlescent), Tyrol Silver (metallic), Burning Red (metallic), Decuma Grey (metallic), Sintra Blue (metallic) and Deep Aqua (metallic). The use of the Glacier Pearl finish (offered on the T Spirit model) required a specific production process to be set up at Toyota Motor Manufacturing France's Valenciennes factory where the new car is built.

In the cabin the driver-focused cockpit introduces a hybrid-specific detailing and trim finishes. The instrument dials – which incorporate a hybrid system indicator - are set within silver rings and feature a combination of blue and white backlighting. The Toyota Touch system on the centre console (T₄ and T Spirit models) includes a blue-lit hybrid energy monitor.

The soft touch pads on the dashboard and front door panels are coloured ice grey and the leather upholstery (T Spirit) and trim around the steering wheel (T₄ and T Spirit) and handbrake (T Spirit) has blue stitching. In place of the standard gear lever, Yaris Hybrid is fitted with a hybrid-specific CVT knob, finished in blue.

DRIVING DYNAMICS

- Yaris Hybrid capable of covering a high proportion of urban journey distances and times with zero tailpipe emissions
- Transmission optimised to deliver a more natural acceleration feel
- Additional on-demand EV and Eco driving modes
- Class leading 4.7-metre turning radius
- Low, 550mm centre of gravity
- Electronically Controlled Braking system

Toyota has thoroughly refined the key elements of Yaris Hybrid that contribute to a rewarding drive, such as the acceleration, braking feel, balance and agility, adding to the inherently quiet and smooth power delivery of its Hybrid Synergy Drive system.

Its engineers have carried out thorough tests to ensure the car's dynamic capabilities will meet customer expectations at all vehicle speeds and in all driving conditions.

Full hybrid in operation

Recent real world tests of Toyota's Hybrid Synergy Drive powertrain reveal that in Yaris Hybrid, zero emissions driving, with the petrol engine switched off, accounts for 66 per cent of the average commuter journey length and 58 per cent of the total journey time.

The electric motor's ability to deliver maximum torque from the moment the vehicle begins to accelerate provides significant benefits in the familiar stop-start urban driving conditions, combining brisk, near silent acceleration from standstill with acceleration under full throttle from nought to 31mph (50km/h) in just four seconds.

Yaris Hybrid's seamless E-CVT electric continuously variable transmission benefits from a new control system to create a more progressive increase in engine revs during acceleration. Optimised for between 70 and 90 per cent throttle opening, the new system suppresses excessive increases in engine rpm, giving the driver a more natural-feeling linear relationship between vehicle and engine speeds.

Driving efficiency, performance and fuel economy can be increased thanks to two alternative, on-demand drive modes.

From start-up and at speeds up to 31mph (50km/h) Yaris Hybrid automatically operates in EV mode, using electric power alone. And, because the car is a full hybrid, the driver can also select EV mode manually.

The level of battery charge will govern how far the vehicle will travel in EV mode, but it allows for urban driving with minimal noise and zero CO₂, NO_x and particulates tailpipe emissions for up to 1.2 miles (2km). And as the petrol engine is switched off, EV mode also makes a significant reduction in overall fuel consumption.

In Eco mode, throttle response to sharp use of the accelerator pedal is reduced and control of the air conditioning is adjusted to support better fuel economy. Depending on driving conditions, using Eco mode can help drivers reduce fuel consumption by about 10 per cent compared to driving in normal mode.

Optimum weight distribution

Extensive use is made of high-tensile steel in Yaris Hybrid's construction, which not only saves weight but gives greater bodyshell rigidity, in turn improving handling stability. High-tensile steel accounts for about 50 per cent of the body by weight, which means overall weight has been reduced with no loss of torsional stiffness.

The wheelbase is the same as the standard Yaris at 2,510mm, but the front overhang has been increased by 20mm to accommodate the hybrid powertrain. With both the fuel tank and smaller hybrid battery located well within the wheelbase and as low as possible, Yaris Hybrid has a particularly low, 550mm centre of gravity and a 63:37 front/rear weight distribution, giving the car well-balanced driveability.

Aerodynamics and class-leading drag coefficient

Aerodynamic efficiency is fundamental to fuel efficiency, vehicle stability and quiet running. Every element of Yaris Hybrid's bodywork has been styled to achieve the best airflow and minimise drag.

The size of the upper and lower grilles was determined to help achieve the right degree of cooling in the engine bay; their shape, too, was optimised to smooth the flow of air.

The profile of the aero corners on the front and rear bumpers, the bonnet, steeply raked A-pillars, door mirrors, roofline, rear lights and even the wheels have all been designed to maximise aerodynamic efficiency.

Going further still, a series of underbody elements have been used to create a flat surface beneath the car to smooth airflow, including a large engine undercover and front, centre and rear spats. There is also a rear undercover with vertical fins that create a laminar airflow effect, improving ride stability.

As a result, Yaris Hybrid has a class-leading Cd 0.286 drag coefficient.

Agile handling and responsive steering

Yaris Hybrid has the standard Yaris's proven combination of MacPherson strut front and torsion beam rear suspension, but modifications have been made to spring and damper rates to take into account the change in weight distribution.

The independent front suspension also benefits from the weight-saving and vibration reduction measures introduced in the current Yaris model, optimising the system's road tracking performance while delivering the appropriate ride, safety, comfort, agility and grip.

The rear torsion beam also benefits from the mass reduction measures and system enhancements introduced with the current generation Yaris to cut vibration levels and improve ride comfort and vehicle agility.

Like conventional Yaris, Yaris Hybrid has a steering gear ratio of 56mm/rev to achieve better steering feel and vehicle response. The bearing rigidity of the rack and pinion gearing reduces friction and the amount of play in the system, further enhancing accuracy and feel. The car has a class-leading 4.7m turning radius, making for easy manoeuvrability in urban streets and parking slots.

Regenerative braking and low rolling resistance tyres

Yaris Hybrid is equipped with an Electronically Controlled Braking system which co-ordinates control of both hydraulic and regenerative braking, which maximises the regeneration of energy by the electric motor during deceleration and under braking.

Ventilated front discs and solid rear discs are fitted to give powerful, progressive and well-balanced braking.

The ultra-low rolling resistance tyres support fuel efficiency while delivering the required levels of grip, and their reduced vertical stiffness serves to improve ride comfort.

EQUIPMENT

- Yaris Hybrid available in three equipment grades: T₃, T₄ and T Spirit
- Focus on high levels of safety, comfort and convenience
- Dual-zone air conditioning, seven airbags and Vehicle Stability Control with traction control standard across the range

The Yaris Hybrid range offers a breadth of customer choice, with three grades available for UK customers: T₃, T₄ and T Spirit. All versions have five doors.

The table below highlights the key equipment features of each grade.

| T₃ | T₄ adds | T Spirit adds |
|---|--|----------------------------------|
| Dual-zone air conditioning | 15-inch alloy wheels | 16-inch alloy wheels |
| Front electric windows | Rear privacy glass | Rear electric windows |
| 6-speaker audio system | Toyota Touch audio control | Cruise control |
| ABS with EBD and brake assist | Rear LED lamps | Smart start system |
| VSC (switchable) with traction control | Front fog lamps | Rain-sensing wipers |
| Seven airbags, including driver's knee airbag | Bluetooth | Dusk-sensing headlights |
| | USB port/Aux-in socket | Auto-dimming rear-view mirror |
| | DAB-ready tuner | Ventilated glovebox |
| | Rear-view camera | Leather parking brake trim |
| | Leather steering wheel trim | Part-leather upholstery |
| | Colour-matched door mirrors and door handles | Passenger seat height adjustment |
| | Driver's seat height adjustment | Front arm rest |
| | | Front footwell illumination |
| | | Rear spoiler |

Safety

The safety equipment features fitted as standard to Yaris Hybrid mirror those provided on the standard Yaris, which helped that car achieve a top five-star crash safety rating from Euro NCAP.

Elements include seven airbags, including twin-chamber front airbags and a driver's knee airbag; ABS with EBD and brake assist; and (switchable) Vehicle Stability Control (VSC) with traction control.

The front seatbelts are equipped with pretensioners and force limiters, and Isofix child seat mounts are provided on the outer rear seats.

Options

Four option packs are available for T₄ and T Spirit versions of Yaris Hybrid, neatly bundling complementary style and protection elements.

The Protection Pack provides mudflaps, hybrid-branded floor mats, black side mouldings and a boot liner. The Protection+ Pack comprises the same items, plus rear parking sensors and a black rear bumper protector.

The Style Pack adds hybrid-branded aluminium scuff plates and chrome-finished side sills and tailpipe trim.

A manually operated panoramic sunroof can be specified as an option for the T Spirit model.

Toyota Touch & Go

The Toyota Touch system, fitted as standard to T₄ and T Spirit versions of Yaris Hybrid, can be upgraded to Toyota Touch & Go, adding satellite navigation and advanced Bluetooth features, plus the ability to access Google Local Search and connected services, such as live parking and fuel price information and local weather forecasts (enabling these services requires registration via Toyota's customer web portal, plus compatible mobile phones with appropriate data plans and tethering).

The system includes all the most popular navigation functions, such as advanced traffic coverage, customisable speed limits, speed camera warnings and motorway signposting. It not only offers drivers a choice of the fastest or shortest route to their destination, but also the one with the smallest environmental impact - an 'ecological' route option.

TOTAL OWNERSHIP COSTS

- On-the-road prices from £14,995
- Ownership savings supported by high fuel economy and sub-100g/km CO₂ emissions
- Low maintenance costs
- Attractive tax position for company car users and fleet operators
- Best-in-class residual value projections

Bringing full hybrid power to the supermini market for the first time presents customers with an opportunity not only to enjoy the benefits of the smooth, highly efficient, low emissions technology, but also to appreciate competitive ownership costs. Fuel economy and lower car tax and maintenance bills and predicted high residual values combine to make Yaris Hybrid a strong proposition.

On-the-road prices are competitive in the segment, particularly when taking the car's advanced technology and high equipment levels into account. Across the range, all models feature seven airbags, dual-zone air conditioning, Vehicle Stability Control with traction control, selectable EV and Eco drive modes and automatic E-CVT transmission.

The best-in-class CO₂ emissions of 79g/km (85g/km for the T Spirit) are well below the UK's 100g/km threshold for earning a Band A zero VED road tax rating and exemption from the London congestion charge.

Fuel costs are kept down thanks to Yaris Hybrid's excellent fuel efficiency. The official combined cycle figure is 80.7mpg (T₃ and T₄ models), but the car is truly in its element around town where in stop-start driving it can accomplish the larger part of most urban commutes in EV mode, which, with the petrol engine switched off, means zero fuel consumption and zero tailpipe emissions.

Toyota's Hybrid Synergy Drive system is designed for low maintenance and high durability. It operates without a clutch, starter motor, alternator and timing belt, as found in conventional

petrol and diesel models, so there is no requirement for these parts to be maintained or replaced, which means lower costs for the customer over several years of ownership. And thanks to the efficiency of the Electronically Controlled Braking system, brake pads can last for up to 60,000 miles before needing replacement.

Thanks to longer component life and reduced labour times, Yaris Hybrid's maintenance costs over 60,000 miles are expected to be among the lowest in its segment. The hybrid battery is rigorously assessed for performance and durability, backed up by 14 years' service in Toyota hybrid vehicles, and is designed to last the car's lifetime.

Yaris Hybrid attracts a benefit-in-kind company car tax rating of 10 per cent, and business operators can claim a 100 per cent write-down allowance for the vehicle in the first year of ownership.

Yaris Hybrid is covered by a five-year/100,000-mile new car warranty, extended to eight years/100,000 miles for the hybrid system components. Warranty data from Prius and Auris Hybrid confirm the outstanding reliability of the Hybrid Synergy Drive powertrain. Insurance groups for the UK model range are due to be announced by Thatcham in June.

Initial residual value forecasts after three years/36,000 miles give Yaris Hybrid a strong residual value of 39 per cent rating in the UK, as rated by CAP. With Prius and Auris Hybrid both rating highly in their classes for residual values, this reinforces the high confidence customers place in Toyota full hybrids.

On-the-road prices

| MODEL | OTR PRICE |
|-----------------------------|------------------|
| Yaris Hybrid T ₃ | £14,995 |
| Yaris Hybrid T ₄ | £15,895 |
| Yaris Hybrid T Spirit | £16,995 |

YARIS HYBRID PRODUCTION AT TMMF

- Toyota Motor Manufacturing France, a dedicated Yaris production centre for more than a decade
- Model range increased with no compromise in production times or quality
- Environmental initiatives to reduce waste and save energy

Toyota Motor Manufacturing France – TMMF – has been building Yaris for more than a decade at its facility in Valenciennes, which was originally conceived as a highly compact plant, designed for a streamlined manufacturing process.

Yaris has already established a reputation for quality, durability and reliability and with the addition of further derivatives, including new Yaris Hybrid, TMMF remains committed to delivering the highest levels of built-in quality.

Building Yaris Hybrid has brought further complexity and new challenges for the assembly process and raised the number of different versions produced on the same line to 62 – a record high.

On average, each Yaris requires the assembly of more than 2,600 parts, with around 80 per cent of the total common to both the standard model and the new hybrid. There are 400 new, hybrid-specific parts to deal with, and 40 per cent of all the assembly processes for vehicle are either new, or have required adaptation. Because the plant is so compact, stock management has had to be readdressed and sequenced delivery organised for a greater number of parts.

TMMF members underwent more than 4,000 hours of Yaris Hybrid assembly training, with a focus on assembly techniques for new on-line parts; recognition of variety among components of a similar kind; and the meeting of key quality targets. Special attention was paid to the inverter assembly, as this component is particularly sensitive to dust and foreign body intrusion.

Around 50 plant members were given specific safety training in how to handle high voltage parts, and new safety procedures were introduced to take into account the fact the new vehicle moves near-silently in EV drive mode. In addition, provisions were made for applying the pearl white paint finish (Glacier Pearl) at TMMF for the first time.

In spite of these changes, and additional logistics complexities such as sequencing the delivery of a greater number of parts, the continuous improvement – *kaizen* – and production line streamlining that are fundamental to the Toyota Production System have meant that, overall, Yaris Hybrid takes no longer to produce than the standard model.

YARIS HYBRID TECHNICAL SPECIFICATIONS

| HYBRID POWERTRAIN | | | |
|--|-------|---|-----------------------|
| Engine type | | 4 cylinders, in-line | |
| Valve mechanism | | 16-valve DOHC with VVT-i | |
| Capacity (cc) | | 1,497 | |
| Bore x stroke (mm) | | 75 x 84.7 | |
| Compression ratio | | 13.4:1 | |
| Max. power (bhp/kW @ rpm) | | 73/55 @ 4,800 | |
| Max. torque (Nm @ rpm) | | 111 @ 3,600 – 4,400 | |
| Emissions level | | Euro 5 | |
| Electric motor type | | Permanent magnet, synchronous | |
| Max. output (bhp/kW) | | 59/45 | |
| Max. torque (Nm) | | 169 | |
| Battery type | | Nickel-metal hydride | |
| Max. system output (bhp/kW)* | | 98/74 | |
| TRANSMISSION | | | |
| Type | | E-CVT electric continuously variable | |
| Transmission gear ratio | Front | 2.636 | |
| | Rear | 2.636 | |
| Differential gear ratio | Front | 3.190 | |
| | Rear | 3.190 | |
| BRAKES | | | |
| Type | Front | Ventilated discs | |
| | Rear | Solid discs | |
| Size (mm) | Front | 275 x 22 | |
| | Rear | 278 x 9 | |
| SUSPENSION | | | |
| Front | | MacPherson strut | |
| Rear | | Torsion beam | |
| PERFORMANCE | | | |
| Max. speed (mph) | | 103 | |
| 0-62mph acceleration (sec) | | 11.8 | |
| FUEL CONSUMPTION | | T ₃ /T ₄ (15in wheel) | T Spirit (16in wheel) |
| Combined (mpg) | | 80.7 | 76.3 |
| Urban (mpg) | | 91.1 | 83.1 |
| Extra urban (mpg) | | 80.7 | 76.3 |
| Fuel tank capacity (l) | | 36 | |
| CO ₂ EMISSIONS, VED & INSURANCE | | T ₃ /T ₄ (15in wheel) | T Spirit (16in wheel) |
| Combined (g/km) | | 79 | 85 |
| Urban | | 71 | 77 |
| Extra urban | | 81 | 85 |
| VED band | | A | |
| Insurance groups | | 8E | 9E |
| OTHER EMISSIONS | | | |
| Carbon monoxide (mg/km) | | 196.8 | |
| Total hydrocarbons (THC, mg/km) | | 43.5 | |
| Non-methane hydrocarbons (NMHC, mg/km) | | 40.4 | |
| NOx (mg/km) | | 6.0 | |
| Particulate matter (PM, mg/km) | | 0.0 | |

| EXTERIOR DIMENSIONS | |
|---|---------------|
| Overall length (mm) | 3,905 |
| Overall width (mm) | 1,695 |
| Overall height (mm) | 1,510 |
| Wheelbase (mm) | 2,510 |
| Front track (mm) | 1,465 |
| Rear track (mm) | 1,460 |
| Front overhang (mm) | 810 |
| Rear overhang (mm) | 585 |
| Drag coefficient (Cd) | 0.286 |
| LUGGAGE COMPARTMENT | |
| VDA luggage capacity – rear seat up (l) | 286 |
| Length (mm) | 710 |
| Max. width (mm) | 1,365 |
| WEIGHTS | |
| Kerb weight (min. – max. kg) | 1,085 – 1,160 |
| Gross vehicle weight (kg) | 1,565 |

*Total power of engine and electric motor (using the battery) combined, measured in-house by Toyota.

YARIS HYBRID EQUIPMENT SPECIFICATIONS

| SAFETY | T₃ | T₄ | T SPIRIT |
|---|----------------------|----------------------|-----------------|
| Driver's twin-chamber airbag | ✓ | ✓ | ✓ |
| Front passenger twin-chamber airbag with cut-off switch | ✓ | ✓ | ✓ |
| Front side airbags | ✓ | ✓ | ✓ |
| Curtain shield airbags | ✓ | ✓ | ✓ |
| Driver's knee airbag | ✓ | ✓ | ✓ |
| ISOFIX child seat fixings on outer rear seats | ✓ | ✓ | ✓ |
| Child-proof rear door locks | ✓ | ✓ | ✓ |
| Front seatbelts with pretensioners and force limiters | ✓ | ✓ | ✓ |
| Five three-point seatbelts with Emergency Locking Retractor (ELR) | ✓ | ✓ | ✓ |
| Whiplash Injury Lessening (WIL) front seats | ✓ | ✓ | ✓ |
| ABS with Electronic Brakeforce Distribution (EBD) and Brake Assist (BA) | ✓ | ✓ | ✓ |
| Vehicle Stability Control (VSC) and Traction Control (TRC) | ✓ | ✓ | ✓ |
| Collapsible steering column | ✓ | ✓ | ✓ |

| | | | |
|---|----------------------|----------------------|-----------------|
| Retractable brake pedal | ✓ | ✓ | ✓ |
| Seatbelt reminder light and buzzer (driver and front passenger) | ✓ | ✓ | ✓ |
| INSTRUMENTS & CONTROLS | T₃ | T₄ | T SPIRIT |
| Analogue odometer | ✓ | ✓ | ✓ |
| Analogue tachometer | ✗ | ✓ | ✓ |
| Trip computer | ✓ | ✓ | ✓ |
| Outside temperature display | ✓ | ✓ | ✓ |
| Digital clock | ✓ | ✓ | ✓ |
| Engine temperature warning | ✓ | ✓ | ✓ |
| Lights on audible warning | ✓ | ✓ | ✓ |
| Door ajar warning | ✓ | ✓ | ✓ |
| Twin speed wipers, variable intermittent with mist function | ✓ | ✓ | ✓ |
| Headlamp levelling adjustment | ✓ | ✓ | ✓ |
| COMFORT & CONVENIENCE | T₃ | T₄ | T SPIRIT |
| Electrically adjustable door mirrors | ✓ | ✓ | ✓ |
| Remote fuel flap release | ✓ | ✓ | ✓ |
| Electric Power Steering (EPS) | ✓ | ✓ | ✓ |
| Cruise control | ✗ | ✗ | ✓ |
| Electric front windows with driver's "one touch" down operation | ✓ | ✓ | ✓ |
| Electric rear windows | ✗ | ✗ | ✓ |
| Rear-view camera | ✗ | ✓ | ✓ |
| Stepless tilt and telescopic steering wheel adjustment | ✓ | ✓ | ✓ |
| Front map lights (2) | ✓ | ✓ | ✓ |
| Front footwell illumination | ✗ | ✗ | ✓ |
| Boot light | ✓ | ✓ | ✓ |
| Driver and passenger vanity mirror with cover and light | ✗ | ✓ | ✓ |
| Accessory power socket (front) | ✓ | ✓ | ✓ |

| | | | |
|---|----------------------|----------------------|-----------------|
| Rain-sensing front wipers | ✗ | ✗ | ✓ |
| Follow-me-home headlights | ✓ | ✓ | ✓ |
| Dusk-sensing headlights | ✗ | ✗ | ✓ |
| Auto-dimming rear-view mirror | ✗ | ✗ | ✓ |
| Smart push-button start | ✗ | ✗ | ✓ |
| AUDIO, COMMUNICATIONS & NAVIGATION | T₃ | T₄ | T SPIRIT |
| 6-speaker audio system | ✓ | ✓ | ✓ |
| CD player with WMA/MP3 reader | ✓ | ✓ | ✓ |
| RDS radio | ✓ | ✓ | ✓ |
| DAB-ready tuner | ✗ | ✓ | ✓ |
| Toyota Touch touchscreen control | ✗ | ✓ | ✓ |
| Toyota Touch and Go multimedia system with satellite navigation | ✗ | Opt | Opt |
| Bluetooth | ✗ | ✓ | ✓ |
| Aux-in/USB connection | ✗ | ✓ | ✓ |
| VENTILATION | T₃ | T₄ | T SPIRIT |
| Dual-zone climate control air conditioning | ✓ | ✓ | ✓ |
| Ventilated glove box | ✗ | ✗ | ✓ |
| Air recirculation and clean air filter | ✓ | ✓ | ✓ |
| SECURITY | T₃ | T₄ | T SPIRIT |
| Transponder engine immobiliser | ✓ | ✓ | ✓ |
| Remote control central double locking | ✓ | ✓ | ✓ |
| Vehicle parts marking – major parts traceable to VIN | ✓ | ✓ | ✓ |
| STORAGE | T₃ | T₄ | T SPIRIT |
| 1-litre bottle holder | ✓ | ✓ | ✓ |
| Cupholders (2 front, 1 rear) | ✓ | ✓ | ✓ |
| Glove box | ✓ | ✓ | ✓ |
| Centre console storage | ✓ | ✓ | ✓ |

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|--|----------------------|----------------------|-----------------|
| Concealed in-dash document holder | ✓ | ✓ | ✓ |
| Front and rear door pockets | ✓ | ✓ | ✓ |
| SEATING, UPHOLSTERY & TRIM | T₃ | T₄ | T SPIRIT |
| Height-adjustable drivers seat | ✗ | ✓ | ✓ |
| Height adjustable front passenger seat | ✗ | ✗ | ✓ |
| 60:40 split-fold rear seats | ✓ | ✓ | ✓ |
| Cloth upholstery | ✓ | ✓ | ✗ |
| Cloth and leather upholstery | ✗ | ✗ | ✓ |
| Cloth door inserts | ✓ | ✓ | ✓ |
| Perforated leather steering wheel trim | ✗ | ✓ | ✓ |
| Leather parking brake trim | ✗ | ✗ | ✓ |
| EXTERIOR & BODY | T₃ | T₄ | T SPIRIT |
| Colour-keyed doorhandles and mirrors | ✗ | ✓ | ✓ |
| Colour-keyed front and rear bumpers | ✓ | ✓ | ✓ |
| Chrome front grille trim | ✗ | ✓ | ✓ |
| Metallic paint | Opt | Opt | Opt |
| Pearlescent paint | ✗ | ✗ | Opt |
| Rear spoiler | ✓ | ✓ | ✗ |
| Front fog lamps | ✗ | ✗ | ✓ |
| LED rear lights | ✗ | ✓ | ✓ |
| Panoramic roof | ✗ | ✗ | Opt |
| Rear privacy glass | ✗ | ✓ | ✓ |
| 15in alloy wheels with locking wheelnuts | ✗ | ✓ | ✗ |
| 16in alloy wheels with locking wheelnuts | ✗ | ✗ | ✓ |
| Space saver spare wheel | ✓ | ✓ | ✓ |

Option packs

| | |
|--|---------------------------|
| Protection Pack – TR | Floor mats |
| | Front and rear mudflaps |
| | Side protection mouldings |
| | Boot liner |
| Protection Plus Pack – TR, SR and T Spirit | Floor mats |
| | Front and rear mudflaps |
| | Side protection mouldings |
| | Rear bumper protection |
| | Rear parking sensors |
| | Boot liner |
| Style Pack – TR and T Spirit | Aluminium scuff plates |
| | Chrome side trim |
| | Chrome tailpipe finisher |