



Toyota Launches D-4D Diesel Engine For RAV4

28 June 2001

Key Points

- Major new market for trend-setting RAV4
- Available in three and five-door bodystyles
- Full time four-wheel drive (two-wheel drive NV version not available with D-4D engine)
- Latest technology, common rail, 2.0-litre D-4D diesel
- Exceptional fuel economy, low noise, low emissions
- Available in the same four trim levels as RAV4 petrol (NV, NRG, GX and VX)
- Excellent combined fuel consumption of 39.8 mpg
- 0-62mph in 12.1 seconds, maximum speed of 106mph
- WIL (Whiplash Injury Lessening) front seats, ABS with EBD (Electronic Brakeforce Distribution) and twin front airbags standard on all grades
- MPV-style versatility with rear seats designed to slide, fold, tumble and be removed
- Air conditioning standard on all grades
- Remote alarm and Thatcham Category One immobiliser fitted as standard
- Roof rails standard on all grades
- Offered with three-year/ 60,000 mile warranty as standard
- On sale in the UK from 1 September 2001
- Priced from £15,995 (NV Three-door) - £1000 premium over petrol version

Toyota is to extend the line-up of its top selling RAV4 Sports Utility Vehicle with the launch of diesel-engined versions for the first time. The RAV4 D-4D exploits the very latest Toyota high pressure, common rail diesel technology and will be available in both three and five door bodystyles in the UK from September. The new RAV4 diesel will offer customers excellent performance, smooth power and outstanding fuel economy.

The introduction of diesel engines will enable Toyota to build on the current success of the RAV4 by taking it into a new, rapidly growing market. Total diesel sales across Europe are forecast to reach five million units a year by 2003. And in the UK most of the recent growth in new car sales are diesel derivatives.

The RAV4 diesel is the latest in a rapidly introduced line of diesel-engined cars by Toyota. Corolla, Avensis, Previa (and soon Yaris) have all seen the addition of diesel to the range.

Excellent Performance

The new versions of the RAV4 will be fitted with the latest generation 2.0-litre, Toyota D-4D common rail diesel engine. This develops 114bhp (85kW) at 4,000rpm and offers constant torque

of 250Nm across the power band from 1,800rpm to 3,000rpm.

Power has been increased by 5bhp over the previous 2.0-litre D-4D engine used on Avensis saloon with the fitment of a variable nozzle turbocharger. Meanwhile, harmful emissions have been decreased with the addition of cooling to the exhaust gas recirculation system. The new RAV4 D-4D complies with European Step III emissions limits.

The high torque output and low fuel consumption of the D-4D engine adds to the impressive list of features for the RAV4 - the fashionable Sports Utility Vehicle which is equally happy either on or off-road.

Fuel consumption is outstanding - 39.8mpg for both the three and five door models on the combined European cycle. Yet performance is still excellent - top speed of 106mph and acceleration from rest to 62mph in 12.1 seconds. The new diesel-engined versions of RAV4 will be available only with full-time four-wheel drive and a five speed manual gearbox.

The New RAV4

Since launch across Europe last summer, RAV4 has proved again to be one of the most popular vehicles in the small SUV market - comfortably beating Toyota sales targets. The new RAV4 has built on the reputation of the original vehicle, launched in 1994 as the first SUV to offer GTi handling and performance with a more rugged appearance and involving driving style.

The RAV4 offers customers more space, better performance, better ride and better economy than other vehicles in the market. Until now it has been available with a choice of 1.8-litre engine with two-wheel drive or 2.0-litre petrol engine four-wheel drive.

More than 30,000 new RAV4s have been sold in Europe in less than 12 months since launch with just over two-thirds of the sales being five door models. Countries where RAV4 has proved a particular success include the UK, Germany, France, and Italy.

Sales in the UK for 2001 for RAV4 are predicted to be 10,500 units of which 3,000 will be with the latest D-4D engine. A restricted supply of RAV4 makes these sales figures lag behind true demand for the car.

RAV4 D-4D in the Fleet Market

The introduction of the new D-4D engines across the Toyota range throughout 2001 broadens the appeal for diesel buyers in the fleet sector.

The Toyota range remains the strongest of any manufacturer in the UK. From the award-winning Yaris, through to the practical Previa MPV to the sporty Celica and stylish RAV4 Toyota has models and model variants that can meet every fleet policy and please every driver - satisfying everyone's needs from the fleet manager to the user-chooser.

The second generation RAV4, introduced in August 2000, offers even more versatility and style to the user chooser market while still preserving its sporty image and youth appeal.

The RAV4 D-4D is a valuable addition to the fleet profile as customers become more aware of fuel economy and lower emissions combined with the growth of the diesel sector of the fleet market. RAV4 diesel also benefits from 20,000-mile service intervals making service maintenance and repair costs even more competitive against the major competition.

As Government calls for companies to be more environmentally responsible fleet managers can be reassured that the RAV4 offers better performance than comparable vehicles with the same engine size; uses less fuel and emits less emissions.

The 2.0-litre D-4D diesel in RAV4 boasts just 190 g/km, which compares against the proposed sliding scale at 23% for the new company car taxation effective from April 2002.

Growing Diesel Market

The diesel market in Europe continues to grow rapidly and is forecast to reach five million units a year by 2003. The largest diesel markets are France, Germany, Spain and Italy - each selling more than 750,000 diesel cars a year. Austria, France, Belgium and Spain have the largest diesel market share - each with more than 50 per cent of all new cars sold as diesel. In the UK diesels accounted for over 312,000 cars last year.

The Sports Utility Vehicle market has always had a high diesel penetration, with more than 50 per cent of all SUVs. However, the small Sport Utility Vehicle market has been less diesel

biased, with around 30 per cent of the 250,000 vehicles sold last year in Europe being diesel powered. This is largely due to the more sporting nature of the small SUV market - and the fact that one of its best sellers, the RAV4, has not been available with a diesel engine, until now.

In 2000, diesels represented 30 per cent of the total car market in Europe and it is forecast that this figure will grow even further in years to come, particularly with the introduction of common rail technology which has helped contribute to the re-evaluation of diesel engines.

In the UK, the new company car tax parameters based on CO2 emissions, becoming effective from April 2002, will certainly contribute to a boost in diesel sales over the next few years. The latest common rail diesel technology has resulted in a dramatic improvement in emission figures not only when compared with previous diesel technology, but compared to petrol engines as well.

HIGH TECHNOLOGY, CLEAN DIESEL

- Latest version of high technology, common rail diesel
- 5 bhp power boost from variable nozzle turbocharger
- Flat torque curve between 1,800 & 3,000rpm
- Low fuel consumption, low emissions
- Complies with Euro Step III regulations

The diesel engine that powers the new additions to the Toyota RAV4 line-up is the latest version of the company's highly successful D-4D, high pressure, common rail unit.

Originally introduced in Europe in the top selling Avensis range, D-4D is widely recognised as one of the most highly advanced diesel technologies on the market today. Toyota engines using D-4D now power Avensis, Avensis Verso, Corolla, Land Cruiser and Previa models.

Further applications of D-4D technology will be announced shortly.

More Power

The 2.0-litre D-4D common rail diesel engine in RAV4 offers class leading performance along with the widest torque band in the market.

The 1CD-FTV engine is a 1995cc, four cylinder, turbocharged and intercooled unit which delivers 114bhp (85kW) of power at 4,000 rpm and maximum torque of 250Nm across the 1,800rpm to 3,000rpm rev range. Bore and stroke is 82.2 x 94.0mm.

A variable nozzle turbocharger has been installed to boost power output while maintaining low emissions and low fuel consumption. Torque is boosted at low engine speeds for improved driveability.

The power boost is achieved by controlling the velocity of the exhaust gas inflow to the turbocharger at all times in response to engine conditions. The speed of the turbine depends on the flow velocity of the exhaust gases going through the impeller. The flow velocity of the gas is controlled by the variable vane nozzle.

The computerised engine control unit calculates the optimum turbocharger pressure from a series of engine operating conditions such as throttle opening, engine speed, atmospheric pressure and water temperature. It then opens or closes 11 variable vanes in the turbo inlet manifold to adjust the intake pressure to the optimum value.

The long term durability of the turbine housing is assured by the use of oxidation-resistant cast iron. The engine block is also cast iron alloy while the cylinder head is lightweight aluminium alloy.

The crankshaft pulley is damped to reduce vibration and drives a V-ribbed belt which powers the alternator. The use of a V-ribbed belt, with auto-tensioner, results in longer belt maintenance intervals and lower running costs. The engine oil filter has also been moved in order to improve access and reduce service times.

Low Emissions

The 1CD-FTV engine meets all European Step III emission legislation with potentially harmful gases and particulates reduced, thanks to the improved fuel consumption and more efficient combustion of the direct injection engine. Emissions of the main greenhouse gas, CO₂, are cut by around 20 per cent.

Improvements to the exhaust gas recirculation unit (EGR) further cut NO_x emissions. A step motor on the EGR valve enables more precise control of quantities and the use of water cooling of the EGR passage lowers the temperature of the exhaust gas, allowing a greater amount to be recirculated.

Twin catalytic converters help the diesel-engined RAV4 meet Step III emissions. One converter, just downstream of the exhaust manifold, uses thin-wall substrates for faster warm-up while a full sized oxidation catalyst beneath the floor ensures cleaner emissions even at low exhaust gas temperatures.

Precise control of fuel injection is achieved through the engine control unit and a 'fly-by-wire' throttle position sensor. There is no accelerator cable.

Reduced Noise and Vibration

Toyota engineers used advanced computer analysis (the Finite Element Method) to study noise and vibration throughout the car which has been reduced to a minimum.

The engine block has been stiffened by reshaping the rear surface, by optimum positioning of ribs and by improving the cylinder wall thickness. These measures not only reduce noise but also lead to increased durability.

The air cleaner case has been increased in size to reduce the amount of air intake noise. On the exhaust side, a ball joint between the downpipe and the main exhaust has been used to reduce vibration.

Extra sound proofing sheets in the front occupant footwells and sound proofing felt on the passenger compartment side of the front panel reduce engine noise transmission.

How Common Rail Works

Until recently, diesel engines relied on relatively simple technology with a low-pressure mechanical injector delivering fuel to a pre-combustion chamber in the cylinder head, where a single ignition - fired by the intense heat of high compression - takes place.

The system was reasonably fuel efficient but lacked precision and refinement, leading to vibration and noise. Fuel combustion can be incomplete, allowing smoke and other emissions to pass into the exhaust.

Toyota's common rail system makes use of a high pressure pump and intelligent, computer controlled injectors to deliver precisely the right amount of fuel, at precisely the right time, directly into the centre of the combustion chamber.

Fuel is stored at high pressure, in a single reservoir - the common rail - before being fired into the cylinder. The high pressure injection creates better fuel atomisation for more power, cleaner burning and better fuel economy. The precise timing and measurement of fuel promotes better ignition, cleaner burning, better fuel economy and less emissions.

In addition, the computer control allows a tiny amount of fuel into the combustion chamber a few microseconds before the main ignition - so-called pilot injection - to provide a degree of pilot burn. This smoothes out the shock of the main combustion to create less noise and harshness and deliver smoother power.

Combustion takes place directly on the piston head for maximum power and efficiency. Each of the four lightweight, aluminium alloy pistons is crowned with a combustion chamber, precisely shaped for optimum burn and fuel efficiency.

RAV4 D-4D Specifications, Pricing and Competitor Comparisons

RAV4 D-4D will be available in the same four high specification levels as the petrol engined version. Even the NV entry level model offers air conditioning, driver and front passenger airbags, roof rails, ABS with EBD (Electronic Brake force Distribution), remote control alarm system, double locking and Thatcham Category One immobiliser. A full equipment list is shown towards the end of this pack.

Pricing for the new RAV4 diesel model at a £1,000 premium over the petrol engined car is as follows:

Model - OTR Price

- NV 3dr 2.0 D-4D 4x4 (Manual) - £15,995
- NV 5dr 2.0 D-4D 4x4 (Manual) - £17,495
- NRG 3dr 2.0 D-4D 4x4 (Manual) - £17,495
- GX 5dr 2.0 D-4D 4x4 (Manual) - £18,695
- VX 5dr 2.0 D-4D 4x4 (Manual) - £20,695

When the specification of the 5-door RAV4 NV at £17,495 is compared with its closest rivals from Land Rover, Suzuki and Vauxhall, the RAV4 is the only car to feature air conditioning as standard. The Land Rover Freelander 2.0-litre TD4 at £18,695 specified to the same level as the RAV4 would cost a further £1,300 to add air conditioning, roof rails and passenger airbag.

Neither the Suzuki Grand Vitara 2.0 TD at £17,000 or the Vauxhall Frontera 2.2 DTI at £18,500 offer ABS as standard equipment meaning that these two cars are almost six per cent and 13.7 per cent more expensive respectively.

Move up the RAV4 range to the GX model at £18,695 and its specification again has the lead over its main competitors. For example, to specify the Vauxhall Frontera 2.2DTI up to RAV4 GX level would cost £2,875 more by having to order an electric sunroof, front fog lamps, alloy wheels, air conditioning and ABS.

A full competitor comparison of both the NV and GX models follows on the next two pages.

TOYOTA RAV4 2.0 D-4D NV 4x4 5-DOOR VERSUS COMPETITORS

| | Toyota | Land Rover | Suzuki | Vauxhall |
|------------------|--------------------|-------------------|---------------------|-------------------|
| | RAV4 | Freelander | Grand Vitara | Frontera |
| | 2.0 D-4D NV | 2.0 TD4 S | 2.0TD | 2.2DTI 16V |
| | 5 door | Wagon | 5 door | Estate |
| | | 5 door | | 5 door |
| Power Steering | √ | √ | √ | √ |
| ABS | √ | √ | X (1,500) | X (£750) |
| Driver's airbag | √ | √ | √ | √ |
| Passenger airbag | √ | X (£350) | √ | √ |

| | | | | |
|--------------------------|---------|----------|--------------|----------|
| Remote locking | √ | √ | √ | √ |
| Alarm | √ | √ | X (£45*) | √ |
| Immobiliser | √ | √ | √ | √ |
| Air conditioning | √ | X (£750) | X (£1,500**) | X (£650) |
| Radio/cassette player | √ | √ | √ | √ |
| Electric front windows | √ | √ | √ | √ |
| Roof rails | √ | X (£200) | √ | √ |
| Power mirrors | √ | √ | √ | √ |
| Steel wheels | √ | √ | √ | √ |
| OTR Price | £17,495 | £18,695 | £17,000 | £18,500 |
| Specification Adjustment | N/A | £1,300 | £1,545 | £1,400 |
| Adjusted Price | £17,495 | £19,995 | £18,545 | £19,900 |
| % +/- v RAV4 | 0.0% | +14.3% | +6.0% | +13.7% |

** ABS + Air conditioning

All option prices taken from manufacturers' recommended retail price lists unless accompanied by * (Jato value)

TOYOTA RAV4 2.0 D-4D GX 4x4 5-DOOR VERSUS COMPETITORS

| | Toyota | Land Rover | Vauxhall |
|------------------|------------------------|-----------------------------|------------------------------|
| | RAV4 | Freelander | Frontera |
| | 2.0 D-4D GX | 2.0 TD4 GS Wagon | 2.2DTI 16V Estate |
| | 5 door | 5 door | 5 door |
| Power Steering | √ | √ | √ |
| ABS | √ | √ | X (£750) |
| Driver's airbag | √ | √ | √ |
| Passenger airbag | √ | √ | √ |
| Remote locking | √ | √ | √ |
| Alarm | √ | √ | √ |
| Immobiliser | √ | √ | √ |
| Electric sunroof | 3 | X (£605) | X (£675) |
| Air conditioning | √ | √ | X (£650) |

| | | | |
|--------------------------|---------|-------------------|----------|
| Radio/CD player | √ | X (£95 CD player) | √ |
| Electric front windows | √ | √ | √ |
| Front fog lamps | √ | X (£172) | X (£200) |
| Roof rails | √ | √ | √ |
| Power mirrors | √ | √ | √ |
| Alloy wheels | √ | √ 15" | X (£600) |
| Hard spare wheel cover | √ | X (£141) | √ |
| OTR Price | £18,695 | £20,195 | £18,500 |
| Specification Adjustment | N/A | £1,013 | £2,875 |
| Adjusted Price | £18,695 | £21,208 | £21,375 |
| % +/- v RAV4 | 0.0% | +13.4% | +14.3% |

All competitors manufacturers' recommended retail price taken from model range price lists.

All option prices taken from manufacturers' recommended retail price lists unless accompanied by * (Jato value)

NEW RAV4 D-4D EQUIPMENT LIST

SECURITY

| | RAV4 NV | RAV4 NRG | RAV4 GX | RAV4 VX |
|---|--------------------|---------------------|--------------------|----------------|
| Remote alarm with perimeter and microwave interior protection | √ | √ | √ | √ |
| Transponder key engine immobiliser | √ | √ | √ | √ |
| Steering column lock | √ | √ | √ | √ |
| Lockable glove box | √ | √ | √ | √ |
| Vehicle parts marking | √ | √ | √ | √ |
| Security window etching | √ | √ | √ | √ |
| Double locking | √ | √ | √ | √ |
| Visible VIN | √ | √ | √ | √ |

SEATING, UPHOLSTERY & TRIM

| | RAV4 NV | RAV4 NRG | RAV4 GX | RAV4 VX |
|--|--------------------|---------------------|--------------------|----------------|
| Driver & passenger seat recline and slide adjustment | √ | √ | √ | √ |

| | | | | |
|--|--------------------|---------------------|--------------------|----------------|
| Driver seat height adjustment | √ | √ | √ | √ |
| 50/50 split detachable and foldable rear seats | √ | √ | √ | √ |
| Rear seat slide adjustment | √ | √ | √ | √ |
| Cloth seat trim and door inserts | √ | √ | √ | 7 |
| Leather seat trim and door inserts | 7 | 7 | 7 | √ |
| STORAGE | RAV4 NV | RAV4 NRG | RAV4 GX | RAV4 VX |
| Front seat back pockets | √ | √ | √ | √ |
| Front and rear cup holders | √ | √ | √ | √ |
| Door storage bins | √ | √ | √ | √ |
| EXTERIOR & BODY | RAV4 NV | RAV4 NRG | RAV4 GX | RAV4 VX |
| Body coloured door handles & exterior mirrors | √ | √ | √ | √ |

| | | | | |
|--|-----|---|-----|---|
| Grey bumpers & side cladding | √ | 7 | 7 | 7 |
| Painted bumpers (contrasting colour) and side cladding | 7 | √ | √ | √ |
| Colour coded bumpers & side cladding (selected colours) | 7 | √ | 7 | √ |
| Colour coded hard type spare wheel cover | Opt | √ | √ | √ |
| Wide cladding pack (painted wheel arch extensions and 235/60 R16 alloy wheels) | 7 | √ | 7 | √ |
| Front fog lamps | 7 | √ | √ | √ |
| Roof rails | √ | √ | √ | √ |
| Rear roof spoiler | Opt | √ | Opt | √ |
| 16" steel wheels with locking wheel nuts | √ | 7 | 7 | 7 |
| 16" alloy wheels with locking wheel nuts | 7 | √ | √ | √ |
| Limited slip differential | 7 | √ | 7 | √ |

Metallic paint

Opt

Opt

Opt

Opt

NEW RAV4 D-4D TECHNICAL SPECIFICATIONS

ENGINE (2.0L D-4D)

1CD-FTV

Valve Mechanism

Variable valve timing, 16 valve, DOHC, Chain Drive

Bore x Stroke (mm)

82.2 x 94.0

Displacement (cc)

1995

Compression ratio

18.6:1

Max. Power bhp/rpm (kW)

114 @ 4,000 (85)

Max. Torque (Nm/rpm)

250 @ 1,800-3,000

PERFORMANCE

0-62mph

12.1 secs

| | |
|-----------|--------|
| Max speed | 106mph |
|-----------|--------|

FUEL ECONOMY AND EMISSIONS

| | |
|-----------|------|
| Urban mpg | 31.7 |
|-----------|------|

| | |
|-----------------|------|
| Extra-Urban mpg | 46.3 |
|-----------------|------|

| | |
|--------------|------|
| Combined mpg | 39.8 |
|--------------|------|

| | |
|----------------------|-----|
| CO ₂ g/km | 190 |
|----------------------|-----|

WEIGHTS

3 DOOR

5 DOOR

| | | |
|------------------|-----------|-----------|
| Kerb weight (kg) | 1315-1425 | 1370-1485 |
|------------------|-----------|-----------|

| | | |
|---------------------------|------|------|
| Gross vehicle weight (kg) | 1785 | 1925 |
|---------------------------|------|------|

| | | |
|-------------------------------|-----|-----|
| Towing capacity-u/braked (kg) | 640 | 640 |
|-------------------------------|-----|-----|

| | | |
|-----------------------------|------|------|
| Towing capacity-braked (kg) | 1500 | 1500 |
|-----------------------------|------|------|

GEARBOX RATIOS

| | |
|-----------------|-------|
| 1 st | 3.833 |
| 2 nd | 2.045 |
| 3 rd | 1.333 |
| 4 th | 0.972 |
| 5 th | 0.731 |
| Reverse | 3.583 |

DIMENSIONS (exterior)

| | 3 DOOR | 5 DOOR |
|---------------------------|------------------|------------------|
| Overall length | 3805 - NV | 4200 - NV |
| | 3865 - NRG | 4250 - GX |
| | | 4260 - VX |
| Overall width (mm) | 1735 | 1735 |
| | 1785 (wide pack) | 1785 (wide pack) |
| Overall height - 4WD (mm) | 1695 (215 tyre) | 1705 (215 tyre) |
| | 1700 (235 tyre) | 1710 (235 tyre) |

| | | |
|------------------------------|------------------------------------|------|
| Wheelbase (mm) | 2280 | 2490 |
| Min. turning radius (m) | 5.0 | 5.3 |
| Tread width - 4WD (mm) front | 1505 (215 tyre) 1525 (235 tyre) | |
| Tread width - 4WD (mm) rear | 1495 (215 tyre) 1520 (235 tyre) | |
| Fuel Tank capacity (L / gal) | 57 / 12.5 | |
| Coefficient of Drag | 0.35 | |

LUGGAGE CAPACITY (L)

3 DOOR

5 DOOR

| | | |
|------------------------|-----|-----|
| Rear seats in position | 150 | 410 |
| Rear seats folded | 230 | 520 |
| Rear seats removed | 690 | 970 |

SUSPENSION

Front
MacPherson Struts with L-shaped arms

Rear
Double Wishbone with trailing arms

BRAKES

Front (diameter)
Ventilated disc (302mm)

Rear (diameter)
Solid disc (298mm)

STEERING

Type
Rack and Pinion

Ratio
16

Turns lock to lock
2.9

TYRES AND WHEELS

Wheel size
16" Aluminium / Steel

Tyre size (NV & GX)(NRG & VX)
215/70 R 16

235/60 R 16

ENDS