FIAT SETS A NEW TECHNOLOGY BENCHMARK WITH TWINAIR

The Fiat 500 Twin air, which is now on sale in Australia, sets a new benchmark for efficiency, low emissions, fuel economy and advanced technology in small cars with its award winning ultra light weight, compact engine using just 4.0 litres of fuel per 100 kilometres on the combined cycle and a miserly 3.6 litres per 100 kilometres on the open road.

Yet this is no boring, dull econo-box that drains the pleasure out of driving quicker than it consumes fuel. For a start TwinAir is in the iconic Fiat 500 and its open top brother, the 500C and that means it starts with being the chic, stylish small car that transformed its class and what people expect in a small car, as well as being a world-wide hit. Then there is the character and performance of the TwinAir engine, combining a rev-happy fun appeal with significantly more power than larger capacity four cylinder units.

Installing a two-cylinder engine in a Fiat 500 might seem like paying homage to the original 9.6 kW model of 1957, but this decision to place the 62.5 kW engine that makes its Australian debut this month is not a sentimental one. In complete compliance with the essential requirements of the 21st Century car owner, the TwinAir engine offers an attractive means of downsizing while substantially reducing fuel consumption and exhaust emissions, but without sacrificing power or driver enjoyment.

Combined with the Fiat 500's many other attributes, this remarkable powertrain is expected to appeal to a wide variety of customers including many who may not have considered Fiat before. Those who care about the environment will find the TwinAir's low CO_2 figure appealing, as will owners who are keen to keep costs down. And it should also find favour with trend setters, drivers interested in innovation and new technologies, and of course customers who enjoy dynamic and fun driving. It is for this reason that Fiat Australia has taken the decision to switch its entire Fiat 500 range over to the TwinAir engine.

Weighing just 85 kg, and with figures from 90 g/km of CO_2, this ground-breaking engine has the lowest emissions of any quantity production petrol engine. However its 62.5 kW makes the Fiat 500 TwinAir among the most powerful mainstream A segment vehicles on sale. And with its 145 Nm of torque at a low 1900 rpm, it's a responsive and fun-to-drive engine too. This combination of cleanliness and power even compares favourably with many rivals' diesel engines.

Compared with Fiat's best-selling 1.2-litre petrol engine in the Fiat 500, the TwinAir delivers 23 per cent more power yet combines this with a 15 per cent reduction in CO_2 emissions and fuel consumption, while fuel consumption drops by a remarkable 30% compared to the 1.4 16v which provides comparable performance and the same high driving pleasure. Furthermore, compared to a four-cylinder of equal performance and displacement of 1.4 litres, the new engine is significantly smaller (down 23%) and lighter (down 10%), opening the way to interesting further developments, such as methane fuel feed or hybrid technology.

The 62.5 kW 500 TwinAir the lowest CO_2 emissions of any production petrol engine at 90 g/km along with a pocket-pleasing 3.9 l/100 km for the Dualogic robotised gearbox version. The five-speed manual records a no less impressive 92 g/km and 4.0 l/100 km.

These amazing results have been achieved thanks to a combination of factors. FPT's MultiAir technology, as employed by the 2010 International Engine of the Year winner, plays a major part in this by reducing consumption and emissions. Combining MultiAir with a turbocharger helps to optimise performance at low revs while reductions in weight and size help boost performance and responsiveness. In addition, the timing chain drastically cuts engine running costs because it is maintenance-free. Finally, a balancing countershaft reduces vibrations to give the smoothness and refinement of a four-cylinder.

This technology comes in a Fiat 500 that is already firmly established on the motoring landscape. And it features all the assets that have made this car such a hit. There's a choice of slick-shifting manual change five-speed gearboxes alongside the Dualogic robotised manual. This allows drivers who want automatic shifting to prompt changes simply by pushing or pulling the gear lever.

There's an extensive list of standard equipment including the all-important safety suite of ABS anti-lock brakes and Electronic Brakeforce Distribution, which along with seven airbags, have helped the Fiat 500 become EuroNCAP crash safety five-star rated.

To mark the significance of its launch, Fiat has given the 500 and 500C TwinAir its own, distinctive appearance and equipment package. Based on the luxuriously equipped 'Sport' equipment package, the 500 TwinAir has 16 inch matt black wheels, metallic effect dashboard, sports seats, Piano Black roof and rear roof spoiler, and satin finish chrome finish door mirrors, door handles and boot lid trim The 500C TwinAir also features its own 'TwinAir' badging.

As well as offering a unique proposition of power with low CO_2 emissions, the high-tech Fiat 500 TwinAir is extremely competitively priced, with the 500 TwinAir manual offering a recommended retail price of $22,990 excluding statutory charges, dealer costs and delivery and $24,990 with the Dualogic gearbox excluding statutory charges, dealer costs and delivery. The open top Fiat 500C TwinAir opens with a recommended retail price of $25,990 excluding statutory charges, dealer costs and delivery and with the self shifting Dualogic gearbox it is $27,990 excluding statutory charges, dealer costs and delivery.

TwinAir: Fiat reinvents the petrol engine

Downsizing might have become a modern mantra but it's the Fiat TwinAir concept that's turned it into an engineering art form. To achieve its goal of extreme downsizing along with optimum thermal efficiency, low friction losses and low weight, a two cylinder engine was deemed essential.

TwinAir is the first engine designed specifically for Fiat Powertrain Technologies' revolutionary MultiAir system and is the result of a £300 million investment. And it's set to become a milestone in Fiat's downsizing strategy thanks to results that are nothing less than astonishing.

Compared with Fiat's renowned 1.2-litre 8v engine, emissions are reduced by 15 per cent while power is up by 23 per cent. It gives the 62.5 kW 500 TwinAir the lowest CO_2 emissions of any production petrol engine at 90 g/km along with a pocket-pleasing 3.9 l/100 km for the Dualogic robotised gearbox version. The five-speed manual records a no less impressive 92 g/km and 4.0 l/100 km.

More importantly for keen drivers, torque – and therefore the engine's flexibility – is boosted in comparison to the 1.2 and is also available lower in the rev range. The maximum 145 Nm of torque is on tap at just 1900 rpm, as opposed to the 102 Nm at 3000 rpm of the larger capacity engine. This means that although the TwinAir-equipped Fiat 500 is the world's most eco-friendly petrol production car, it's still capable of a lively turn of speed. It'll accelerate from 0-100 kmh in just 11 seconds while its maximum speed is 173 kmh.

In comparison withthe 1.4 engine that has been the mainstay of the 500 range in Australia, fuel consumption drops by a remarkable 30% while offering comparable performance and the same high driving pleasure. Furthermore, compared to a four-cylinder of equal performance and displacement of 1.4 litres, the new engine is significantly smaller (down 23%) and lighter (down 10%), opening the way to interesting further developments, such as methane fuel feed or hybrid technology.

TwinAir was designed from a blank sheet of paper, and is the first engine to be devised from the outset to exploit MultiAir technology. As such, it relies on a new electro-hydraulic valve management system. This controls the air flowing into the engine through the inlet valves rather than the throttle valve. Airflow is managed cylinder by cylinder, cycle by cycle, phase by phase according to the driver's and therefore engine's requirements. By rigorously controlling the combustion process like this, pumping losses of around 10 per cent can be eliminated while valve control strategies can be optimised, thereby reducing polluting emissions.

In addition to this, closing the intake valves early to maximise the air introduced into the cylinders, and constant air pressure upstream of the cylinders, leads to prompt accelerator responses and improved torque at low speeds.

Performance is further boosted by a new generation turbocharger that increases maximum torque as well as making it available at very low revs. It ensures the TwinAir engine is more flexible and responsive compared with normally aspirated units, yet it remains simple to manufacture and therefore strong and reliable too.

One of the core strengths of MultiAir – and therefore of this new line up of TwinAir engines – is that efficiency is built-in from the ground up. Because engineers were designing from scratch, they had the freedom to make some unique decisions. The size of the cylinders was determined following an in-depth study of thermodynamic and fluid dynamic performance, hence a capacity of just under 450 cc per cylinder.

The basic two-cylinder architecture, combined with the low friction of internal parts, ranks this engine as the most efficient in the world thanks to the minimising of frictional losses. And because it has two fewer cylinders than existing engines of comparable power, the TwinAir unit is 23 per cent shorter and 10 per cent lighter.

To ensure there are no compromises in TwinAir ownership, FPT has paid special attention to noise, vibration and harshness (NVH). In order to maintain the two-cylinder's characterful hum while banishing vibration, a balancing countershaft, running at the same speed as the crankshaft in needle roller bearings to reduce friction, has been used. This gives the engine the same smoothness and refinement as a four cylinder throughout the rev range.

As with other recent Fiat Group cars, the Fiat 500 TwinAir comes with Start&Stop as standard. This temporarily cuts the engine when the car is stationary and in neutral. It then re-fires automatically when the clutch is pressed. As well as reducing fuel consumption it also makes the passenger compartment a quieter, more relaxing place to spend time.

Giving drivers further flexibility, there is a dashboard-mounted ECO button. This enables them to choose a more economical car or one that's more responsive depending on their mood and environment. In Normal mode, the maximum available torque for optimum response to accelerator inputs is enabled. This gives the TwinAir a sporting feel and to complement this, the electric power steering remains unaltered.

But press the ECO button and maximum torque is cut by 45 Nm to 100 Nm at 2000 rpm. This improves consumption by allowing the driver to adopt a style more suited to cities. As well as this, the steering automatically adjusts to its lighter City setting. In the five-speed manual model, the word ECO appears on the dash, denoting it's been activated. In the five-speed semi-automatic Dualogic version, the letter E appears on the dash and the gearbox switches to eco mode to further aid economy.

The Gear Shift Indicator (GSI) is another 'driver assist' designed to improve fuel consumption. This uses arrows on the dashboard to tell the driver the most efficient point to change gear. An up-change might be suggested to allow the engine to burn a leaner mixture, while changing down might make the best use of the available torque.

Fiat 500: Retro chic gets cutting edge cool

TwinAir is another remarkable chapter in the success story of Fiat's city car, the Fiat 500.

Launched in Europe in 2007, the Fiat 500 was an instant hit. It was awarded the coveted International Car of the Year crown for 2008, the year it arrived in Australia, along with a host of other accolades. And its unique brand of class-leading style, safety, technology, comfort and equipment continue to make it a must-have with drivers everywhere.

Now, three years after its launch, the legend is further strengthened with the Fiat 500 becoming the first car in the world to feature Fiat's unique TwinAir technology. It's an engine perfectly suited to the Fiat 500's many attributes because it combines ground-breaking economy and ultra-low emissions with a zesty personality designed to bring a smile to any driver's face. It also gives the Fiat 500 best-in-class performance and means owners will pay no Vehicle Excise Duty in the UK.

TwinAir's innovative characteristics sit perfectly with the Fiat 500, which at its launch brought several unprecedented attributes to the city car segment. It leapt straight to the top of its class for passive and active safety by achieving the maximum five stars in the Euro NCAP crash safety test programme. And it was the first time that such a small car had been equipped with seven airbags as standard.

Then as now, the Fiat 500 offered the sort of equipment levels you usually associate with far larger cars. All feature ABS anti-lock braking, remote central locking, electric front windows and door mirrors, an MP3-compatible CD player and Dualdrive electric power steering.

Importantly, none of the Fiat 500's class-leading safety equipment has been sacrificed by adding the TwinAir engine to the range. It maintains its five-star EuroNCAP safety rating and still features ABS anti-lock brakes with EBD Electronic Brakeforce Distribution, ASR Anti-Slip Regulation to limit wheelspin during acceleration and MSR engine braking regulation to modulate brake torque while changing down. The Fiat 500 can also be specified with a sophisticated ESP Electronic Stability Programme to control the car through corners, while Hydraulic Brake Assistance and Hill Holder for smooth hill starts are available too.

To make life that bit easier for drivers, Fiat's brilliant Blue&Me and Blue&Me TomTom are also standard. This award-winning hands-free system employs Bluetooth connectivity to let the driver make and manage phone calls or listen to an MP3 player using voice activation or steering wheel controls. It also incorporates a trip computer and is now completely compatible with an iPod.

Blue&Me TomTom combines the regular Blue&Me with the preparation for an optional a high-resolution 4.3-inch colour screen. Housed in a portable unit, this mounts on the upper part of the dash. It combines a cost-effective alternative to the best of after-market satellite navigation technology with none of the aggravation, and at less than you'd expect to pay for a manufacturer's original equipment. It offers the latest in sat nav technology such as touch screen controls, different voice options, bird's eye view and points of interest along with full Australian coverage.

It will even communicate with the car's onboard computer, and if the Fiat 500 is running low on fuel the sat nav will show where the nearest petrol station is. To further enhance the TwinAir's appeal to eco-friendly drivers, Fiat's revolutionary and remarkably popular eco:Drive programme is also available as standard on every model.

Designed in conjunction with software giant Microsoft, eco:Drive gathers information on vehicle efficiency and driving style and can be used to give a real-time indication of fuel consumption with tips for more economical driving. This data can be transmitted through the USB port of the Blue&Me infotainment system to a standard USB key. It can then be read on a computer and a website will analyse how efficient the driver is in terms of fuel consumption and emissions. As well as that it will give drivers a score out of 100 on an eco:Index, and offers tutorials to help improve that score and achieve more eco-friendly driving.

The Fiat 500C Convertible TwinAir

"The Fiat 500C is not merely the open version of the 500," explains Roberto Giolito, Fiat & Abarth Style Director. "In fact, thanks to the wide range of available versions, this new model is really a whole new car in its own right, with a strong personality inherited from the original 1957 model and an undoubted sentimental value brought to it by so many fans over the years. If, on the one hand, the Fiat 500C respects the original version, on the other it enriches it with new features which, thanks to stylistic choices, afford each one of us maximum freedom of use."

The Fiat 500C uses a deeper windscreen than the Fiat 500. This is needed to resize the upper cross member; and affords a better view for the rear passengers, increases torsional rigidity and facilitates clean lines. These are also enhanced by the continuity of the windscreen, which extends to the fabric roof without exposing any part of the bodywork (an elegant and technologically sophisticated solution in keeping with the spirit of the 500C).

If the soft top is down and the boot release is activated, an electronic system automatically lifts the hood a few centimetres to allow the boot to be fully opened. This functional and neat solution contributes to the fact that the Fiat 500C is best in class for ease and versatility of loading and unloading. The luggage compartment itself, (with a capacity of 182 litres – just three litres less than the saloon version), together with a traditional upwards-opening boot and wide access, is spacious and easy to load.

The interior of the Fiat 500C boasts top quality materials. In particular, the new sporty seats are upholstered in a high quality durable fabric. The backrest and cushions of the rear seats keep passengers well located.

An innovative soft top for a unique style

The Fiat 500C soft top is characterised by sophisticated electrically controlled movements and innovative technical solutions. In particular, a colour-coded moulding of the same colour as the soft top acts as a spoiler and houses a third brake light, creating similar aerodynamics to the saloon version – a class-leading Cd of 0.33.

In addition, when the soft top is down, the spoiler is arranged so that the third brake light is always visible. The double-layered roof fabric ensures the best possible insulation from the elements, and along with the fabric covered pillars, completes an attractive finish from the inside.

The electrically operated soft top can be controlled either by buttons next to the interior roof light, or from the car's remote control unit. In addition, the soft top can be operated at any speed under 60 kmh.

The soft top is designed to be easy to use: to open it, just press the button for at least half a second to trigger the movement that then continues automatically up to the spoiler position (a midway point can of course be chosen by pressing the button again). Press the button again for at least half-a-second to fully open the roof. When using the remote control, the roof can be opened only as far as the spoiler. For safety reasons, the roof stops at around 25 cm from complete closure; (just press and hold the button to complete the movement).

When the boot is open, the soft top can only be closed (the opening function is de-activated). However, if the roof is fully open and the boot needs to be opened, the soft top automatically moves to a midway point to avoid obstructing loading operations.

Finally, the standard wind-stop can easily be positioned behind the rear headrests (attached to the parcel shelf). This wind tunnel-tested accessory has been designed specifically for the Fiat 500 C. It offers a notable reduction in turbulence for all passengers, at all speeds, and there is no need to remove the wind-stop to open or close the soft top (another unique feature for this vehicle segment).

Fiat: A history of progress

The Fiat Group's TwinAir project is just the latest in a series of technological developments that has seen the company establish a new pre-eminence in the field of automotive engines. Here are just some of its most recent achievements:

1985 - FIRE engine (Fully Integrated and Robotized Engine)

Developed during the early 1980s, the FIRE engine adopted the most advanced combustion and fluid dynamics technologies of the day. The engine structure was designed to be produced cost-effectively on highly automated, robotised production lines. Today FIRE is still the best in its class and its modern,

flexible design can be continuously and easily updated with state-of-the-art technologies such as turbocharging and MultiAir.

1987 - The world's first direct injection diesel engine for cars

Fiat introduced the world's first direct injection diesel engine in 1987 on the Croma. It featured a variable geometry turbocharger. Fuel consumption was a remarkable 15 per cent better than previous generation pre-chamber diesel engines, and 30 per cent less than equivalent capacity petrol engines.

1997 - Common Rail technology

While working on direct injection, Fiat's engineers discovered that a fundamental revolution of the system could dramatically improve engine performance, noise, refinement and emissions. They began looking into an electronically controlled diesel injection system under the research name of UNIJET. The industrial feasibility of Common Rail was demonstrated in 1993. The world's first Common Rail direct diesel engine was introduced in 1997.

2003 - MultiJet technology and Small Diesel Engine (SDE)

MultiJet was the second generation of Common Rail technology employing electro-hydraulic injectors to give up to five injections during one combustion stroke. The introduction of pre-injection further reduces combustion noise while post-injection reduces particulates and allows particulate filter regeneration. MultiJet was designed for the new 1.3-litre SDE, the smallest direct injection quantity production diesel ever made.

2009 - MultiJet II technology

By using up to eight injections during each combustion stroke, MultiJet II is the latest incarnation of diesel direct injection. An innovative hydraulically balanced servo valve allows faster, flexible programming of injection events and is the basis for increasingly advanced combustion control strategies.

2009 - Award-winning MultiAir technology

Introduced on the 1.4-litre FIRE petrol engine, MultiAir is a revolutionary electro-hydraulic valve control system for dynamic, direct air and combustion management, one cylinder at a time, one stroke at a time. By directly controlling the air through the engine intake valves without using the throttle, MultiAir allows a drastic reduction in fuel consumption and therefore polluting emissions. The engine's response is considerably improved too. In June, the FPT 1.4 Turbo engine with MultiAir technology won the prestigious Engine of the Year Award in the Best New Engine of the Year category.

2010 - Award-winning TwinAir: the world's first high-tech two-cylinder

With its 875cc capacity and two-cylinder layout, TwinAir is an example of radical downsizing to obtain extremely low CO_2 emissions and fuel consumption levels in A and B segment cars. Currently, TwinAir is the cleanest quantity production petrol engine in the market – a fact recognised by the European Autobest jury members who recently awarded their prestigious Technobest 2010 prize to FPT for the innovative new TwinAir engine.

The New Fiat 500

Technical Specifications

	Fiat 500		Fiat 500C	
	Three door hatchback		Two door convertible	
	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Number of cylinders, layout	Two cylinders, inline, transverse, driving the front wheels			
Capacity (cc)	875			
Bore x stroke (mm)	80.5 x 86			
Compression ratio	10.0 : 1			
Max. power (kW) normal/Eco	62.5/57.0			
at rpm	5500			
Peak torque (Nm) normal/Eco	145/100			
at rpm	1900/2000			
Fuel system	Fully variable valve lift on intake, fixed timing on exhaust, multipoint fuel port			
Tappet control	MultiAir on intake, RFF on exhaust, single overhead camshaft			
Number of valves	4 per cylinder, 8 in total			
Ignition	Electronic with static advance combined with ignition			
Transmission	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Drive	Front			
Type	Manual	Electro hydraulic robotized manual gearbox	Manual	Electro hydraulic robotized manual gearbox
Gear Ratios				
1st	4.100	4.100	4.100	4.100
2nd	2.185	2.185	2.185	2.185
3rd	1.345	1.345	1.345	1.345
4th	0.974	0.974	0.974	0.974
5th	0.766	0.766	0.766	0.766
6th	-	-	-	-
Reverse	3.818	3.818	3.818	3.818
SUSPENSION, CHASSIS	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Suspension, Front	Independent-wheel, MacPherson-type with lower transverse wishbones secured to an auxiliary cross member, anti-roll bar connected to the shock absorber			
Suspension, Rear	Inter-connected suspension through torsion beam and anti-roll bar			
Steering	Rack & pinion with Dualdrive electrical power steering			
Steering, Turning Circle	9.28 m			
Brakes, front	Disc, 257 mm diameter			
Brakes, rear	Drum, 180 mm diameter			
Wheels	6.5J x 16 Alloy, Matt black finish			
Tyres	195/45 R16			
Spare tyres	Space Saver			

PERFORMANCE	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Top Speed (kmh)	173	173	173	173
Acceleration (0-100 km/h)	11.0	11.0	11.0	11.0
Fuel Consumption (l/100 km)				
City Cycle	4.7	4.4	4.7	4.4
Highway Cycle	3.6	3.6	3.6	3.6
Combined	4.0	3.9	4.0	3.9
CO2 emissions (g/km)	92	90	92	90
Fuel Tank (litres)	35 litres			
DIMENSIONS	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Length	3546			
Width	1627			
Height	1488			
Track front/rear	1414/1408			
Wheelbase (mm)	2300			
Luggage Space (l) rear seats up/down	185/550		182/550	
Fuel tank (l)	35			
Kerb weight	900	900	920	920
Towable weight, braked/unbraked	400/800	400/800	400/800	400/800
Payload	440	440	415	415

The New Fiat 500

Equipment and Features

	Fiat 500		Fiat 500C	
	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Internal				
Climate Control Air-conditioning	std	std	std	std
Trip Computer	std	std	std	std
Power windows	std	std	std	std
Remote Central Locking	std	std	std	std
Fixed glass sunroof with blind	Opt	Opt	NA	NA
Height adjustable front head rests	std	std	std	std
Height adjustable rear headrests	std	std	std	std
Height adjust steering wheel	std	std	std	std
Height adjustable driver's seat	std	std	std	std
50/50 split fold rear seat	std	std	std	std
Lockable fuel cap	std	std	std	std
Satin finish exterior mirrors, door handles, boot trim	std	std	std	std
Side bump strips with provision for personalised badges	std	std	std	std
Luxury leather steering wheel	std	std	std	std
Leather covered gear knob	std	std	std	std

Cigarette Lighter	std	std	std	std
Chrome Door Sills	std	std	std	std
Seat back pockets	std	std	std	std
SAFETY	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
ABS with EBD	std	std	std	std
Dual stage driver and passenger airbags	std	std	std	std
Side Airbags	std	std	std	std
Window Airbags	std	std	std	std
Drivers Knee Airbag	std	std	std	std
Front seat pretensioners with load limiter	std	std	std	std
Anti-submarining front seats	std	std	std	std
Stability & Traction Control, HBA & Hill holder	std	std	std	std
Front foglights	std	std	std	std
AUDIO	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
6 speaker MP3 Compatible CD Player	std	std	std	std
Steering Wheel mounted audio controls	std	std	std	std
Bluetooth handsfree mobile connection with steering wheel mounted controls	std	std	std	std
USB media connection port	std	std	std	std
Options	TwinAir	TwinAir Dualogic	TwinAir	TwinAir Dualogic
Electronic Sky Dome sunroof with sunblind	opt	opt	NA	NA
Luxury Pack(Leather steering wheel and gear knob, Bluetooth phone connection & USB media connection port	std	std	std	std
16" Sport Alloy Wheels Matt Black finish	std	std	std	std
Metallic Paint	opt	opt	opt	opt
Pastel Paint	opt	opt	opt	opt
Leather Seat	opt	opt	opt	opt