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The Audi A3 Sedan

Short version

Compact and dynamic four-door models: The Audi A3 Sedan

With the launch of the sporty A3 Sedan, Audi is entering the world's largest market segment – the class of compact sedans. The third model in the successful A3 model line impresses with ultra-lightweight excellence, strong and very efficient drivetrains, and a great many high-end infotainment and driver assistance systems.

Audi's first notchback model in the premium compact class, the Audi A3 Sedan's sporty character is dazzling. It all starts with a kerb weight of just 1,250 kg for the four-door 1.4 TFSI with S tronic, thanks to Audi's lightweight design mastery. Many of the components in the occupant cell are made of high-end hot-formed steel; the bonnet is aluminium. The low weight of the chassis and engines also sets new standards.

Some 4,460 mm in length, the design of the Audi A3 Sedan combines classic notchback styling with the dynamic lines of a convertible. The flat roof line terminates at the C-pillar and merges seamlessly with the shoulder line. The tornado line is a prominent contour edge and the wheel arches are flared.

As with all Audi vehicles, the single-frame radiator grille is the primary design element up front. The bumpers, which terminate in striking horizontal contours, as well as large air inlets underscore the width of the A3 Sedan. Audi can optionally fit this new model with all-LED headlights, a marvel of engineering and a feast for the eyes alike. Taillights boasting LEDs are also available.

The roomy interior of this sporty four-door car is refined and straightforward. Its instrument panel is lean; the centre console is slightly angled toward the driver. The large round air vents, the three-dimensional decorative inlays and the air conditioner's elegant control panel evince the attention to detail that Audi devotes to every vehicle. As in all Audi models, controls are easy-to-use and self-explanatory. The 425-litre luggage compartment can be extended by folding down the rear seat backs.

Three engines will be available for the Audi A3 Sedan in Australia: one TDI and two TFSI units. They respectively exhibit 1.4, 1.8 and 2.0 litres of displacement, and feature power outputs between 103 kW and 132 kW. All three engines have been overhauled to combine robust power with astonishing fuel efficiency. A particular highlight for the 1.4 TFSI is the cylinder on demand (COD) system. At low loads, it temporarily shuts off two cylinders.

The A3 Sedan powertrain is also best-in-class. The sporty S tronic dual-clutch transmission is standard. When combined with the Audi drive select dynamics system (standard on Ambition models), the S tronic boasts a free-wheeling function that further reduces fuel consumption. quattro permanent all-wheel drive is also available for the 1.8 TFSI engine.

The sporty personality of the Audi A3 Sedan can be traced in part to an optimised distribution of axle loads (59% to 41%, front to rear) and a sophisticated chassis. The MacPherson front suspension contains some aluminium components, while the four-link rear suspension handles longitudinal and lateral forces separately.
A sensitive power-steering system features an electromechanical drive for high efficiency. Audi can also install progressive power steering, which varies the steering ratio. Electronic limited slip differential – an intelligent subsystem of electronic stabilisation control (ESC) – makes handling even smoother and safer during fast cornering.

Wheels measure between 17 and 19 inches in diameter. 19-inch wheels are available only in conjunction with a sports suspension

Groundbreaking: Infotainment

Audi offers its A3 Sedan customers a comprehensive range of infotainment modules; top-of-the-line options include a Bang & Olufsen sound system and MMI navigation plus. The latter's ultra-sleek 7-inch screen extends electronically from the instrument panel. The user terminal has a turn/push control designed as a "touchwheel" with MMI touch – the touchwheel's top surface is a touch-sensitive pad for inputting letters and numbers.

A broad assortment of assistance systems also bolsters the A3 Sedan. They range from adaptive cruise control to Audi side assist, Audi active lane assist and the park-assist system with surround-view camera to the safety system

Audi pre sense. The driver information system with rest recommendation is standard in all models.

Equipment lines also feature their own respective interior colours. The S line sports package for the Ambition line, for instance, bathes the interior entirely in black. Available upholstery materials include a mix of natural and man-made leather, Milano leather and a combination of Pearl Nappa leather and Alcantara.

Individual options such as Audi adaptive light and a panoramic glass sunroof are taken directly from the luxury class. Remarkably, the Audi plant in Györ, Hungary was expanded solely to build the A3 Sedan.

At a glance:

The Audi A3 Sedan

Design and body

– Sporty, elegant design with elongated styling, long wheelbase and short overhangs; length of 4.46 metres
– Intelligent multimaterial construction, aluminium bonnet, occupant cell consists primarily of high-end steel
– Kerb weight of Audi A3 Sedan 1.4 TFSI with S tronic just 1,250 kg
– All-LED headlights and LED taillights available as options

Interior

– Spacious interior, luggage capacity of 425 litres, folding rear seats
– Clear controls, elegant design and superb workmanship
– Highlights include three-dimensional inlays and round air vents

Drivetrain

– Upon launch, a TDI engine with 110 kW and two TFSI units with 103 kW or 132 kW
– All engines feature the latest efficiency technologies, 1.4 TFSI with COD technology
– Power transmission via manual transmission or S tronic; quattro drive system also available

Chassis

– Some front-suspension components made of aluminium; four-link rear suspension
– Electromechanical steering
– Alloy wheels (16-inch to 19-inch), powerful brakes
– Electronic stabilisation control (ESC) with electronic limited slip differential is standard
– Audi drive select dynamics system (standard in Ambition models)

Equipment packages

– Generous range of standard equipment, plus many convenient and sporty extras
– Optional cutting-edge driver assistance systems

– Wide range of infotainment components, including MMI navigation plus with a
touchwheel and seven-inch monitor; Bang & Olufsen sound system

Full version

Foray into the world's largest market segment: the Audi A3 Sedan

The Audi A3 Sedan is a born winner. This sporty four-door model with an elegantly flowing notchback bears all the strengths of Audi's successful A3 model line. Three engines are available for this sedan. It represents Audi's foray into a new market segment.

Body

Lightweight design/construction is one of Audi's core areas of expertise. As a pioneer in this field, Audi discontinued and then reversed the trend toward ever-heavier vehicles. Regarding the basic version of the new A3 Sedan with S tronic,
the kerb weight (without driver) is just 1,250 kilograms, which sets a new standard in this class. Yet this four-door vehicle is stately, too: 4456 millimetres in length, wheelbase of 2637 mm, 1796 mm in width and 1416 mm in height.

Ultra-lightweight: multi-material body

Vehicle body engineers at Audi possess a wealth of expertise in aluminium, steel or composites. They do not limit themselves to any one material; on the contrary, they rely on any and all materials that result in a perfect blend of properties.

Form-hardened steels constitute 26 percent of the A3 Sedan's body. Before deformation, they are heated in a continuous-flow furnace to nearly 1,000 degrees Celsius and are then cooled to about 200 °C in a water-cooled stamping press. This radical drop in temperature creates an iron-carbon structure of exceptional tensile strength. Components made of these high-end steels can exhibit relatively thin walls, making them lightweight.

Form-hardened components are used in the transition from the front of the vehicle to the occupant cell, in the A-pillars, roof arch, centre tunnel, side sills and floor panels. The B-pillars also consist of this form-hardened steel. Their lower sections are more flexible than higher ones, as the energy of a side-impact collision must be absorbed here. Audi uses high-strength and ultra-high-strength steel grades in many other body areas, such as the longitudinal members and the C-pillars. Something known as a tailored

rolled blank joins the floor with the rear body section. Such a blank has 11 individual segments of five different thicknesses.

Moreover, the bonnet, the front axle's subframe, the energy-absorbing section behind the front bumper and the rear shelf are all made of aluminium. All in all, these light-alloy components save 12 kilograms. This advancement benefits the distribution of axle loads. The front-end axle carrier is made of high-strength plastic and weighs three kilograms less than its predecessor.

The vehicle body of the A3 Sedan features a remarkable variety of joining techniques. In addition to classic resistance spot welding – which creates 5,467 weld spots – primary techniques include MIG/MAG welding, laser welding, stud welding, projection welding, clinching, seaming and semi-tubular punch riveting. Just one A3 Sedan body contains 54 metres of structural adhesive, five metres of retaining adhesive, 20 metres of seam adhesive and four metres of lining adhesive.

A laser-brazed seam serves as a high-precision joint between the vehicle's side wall and roof. This seam is smoothed with brushes, resulting in a practically invisible zero-joint that demonstrates Audi's commitment to precision. The seams around the tailgate's water drains are executed via plasmatron brazing. The doors and window frames are pressed in one piece, which likewise reduces weight. Cutting-edge remote laser welding is used for the doors.

Benchmarks: rigidity, acoustics, safety and aerodynamics

Thanks to the extensive resources Audi commits to body manufacturing, the A3 Sedan boasts excellent static and dynamic torsional rigidity. This contributes to the vehicle's excellent precision of manufacture and quiet interior. A noise-insulating windshield is standard equipment, as are two wraparound soundproofing seals that minimise wind noise at doors and windows. The outside mirrors were designed to likewise reduce interior noise levels. Noise-insulating materials in the interior, especially the moulded part between the floor and carpeting, are very lightweight yet highly effective.

The new Audi A3 Sedan is tops when it comes to passive safety. In a frontal collision, the front cross-member distributes the forces to the two side members, which undergo defined deformation to dissipate these forces.

Additional crumple zones include the front axle’s subframe and sections in the upper part of fenders. In a side impact, hot-shaped steel components such as the sills and B-pillars offer occupants excellent protection. In a rear-end collision, the bumper's cross members transmit the stress to large longitudinal members.

The Audi A3 Sedan features a drag coefficient of just 0.29, thanks in part to finishing touches in concealed areas. Covers made of glass-reinforced plastic line the underbody up to the B-pillars. These covers protect the sheet metal and engine from salt, water and pebbles while absorbing vibrations. A small spoiler in front of every wheel helps minimise loss of airflow. The aerodynamic underbody of the new A3 reduces overall aerodynamic drag by about 12 percent.

Exterior design

Concentrated, athletic and taut: the Audi A3 Sedan is precise and distinctive from A to Z. Wedge-shaped headlights featuring a wave-shaped lower edge impart a determined appearance to this new model. In the optional Xenon plus modules, LED daytime running lights form visually uniform contours of light at the upper and lower edges. The turn signal is in the tapered inner corner underneath a chromed strip.

Different versions of Audi headlights offer appealing options. A high-beam assistant and Audi adaptive light are but two examples. The latter’s control unit regulates swiveling modules to ensure the most suitable lighting at all times – whether in urban areas, rural areas, or on the highway. These modules also serve as specialised turning, cornering and all-weather lights. The driver can use Audi drive select to tweak the operation of adaptive light.

Optional LED headlights are another high-end solution for the Audi A3 Sedan; this technology is straight from the luxury class. At a colour temperature of
5,500 Kelvin, their light resembles daylight and reduces eye fatigue. These light-emitting diodes are designed to last the entire service life of the vehicle itself and very energy-efficient. The low beams consume just 40 watts per unit.

Audi uses the design of its LED headlights to demonstrate just how beautiful technology can be. Nine high-performance LED chips in two free-form reflectors generate the low-beam light, while the high beams consist of eight high-performance LEDs and a matte-polished aluminium embellisher. The static turning and all-weather lights are housed in a separate module. In addition, the daytime running lights, parking lights and turn signals are formed by a light guide that wraps around the upper and inner headlights as a narrow contour. A diagonal imparts structure to its inside.

Widespread appeal: The front end

The front of the Audi A3 Sedan is broad and determined. The single-frame grille with its tapered upper corners is black. Its horizontal slats and the Audi rings appear three-dimensional. A refined chrome frame encloses the grille. The lower section of the bumper tapers to a pushed-forward edge. Upright bars offset the air inlets and render them three-dimensional. Fog lights – standard in the Ambition equipment line – are housed in the air inlets' corners.

The Audi A3 Sedan does not have a single metal panel in common with its sister model, the A3 Sportback. Even the low bonnet has been redesigned. Its prominently rendered outline complements the flowing lines of the headlights. And the crisply focused tornado line – a contour edge along the entire side – divides the area underneath the windows. A similarly pronounced dynamic line above the sills assertively extends upward toward the rear.

These two lines enclose the sides of the vehicle. The interplay of light and shadows highlights the sides, imparting an athletic and muscular personality to the A3 Sedan. The wheel arches have become considerably more flared to make room for optional 19-inch wheels. As with a sports car, the exterior mirrors with integrated LED turn signals are mounted on the doors. The ratio of vehicle body to passenger compartment is two-thirds to one-third – typical Audi proportions.

In structural terms, the Audi A3 Sedan lies between a classic notchback design and that of a convertible. Its curved roof slopes elegantly toward the rear and merges seamlessly with the shoulder line. This transition expresses this four-door vehicle's dynamic personality. A compact boot lid terminates

in a pronounced arc that serves as a contour edge and spoiler lip.

The A3 Sedan's tail end is typical of Audi. It is assertively three-dimensional and boasts a seamless transition from the bumper to the license plate. Twin exhaust tailpipes are encircled by a diffuser insert. The vehicle's width is further underscored by large and flat taillights that taper inward to a point. Audi generally supplies the taillights as LEDs in conjunction with Xenon plus or LED headlights. Light guides form elegant arches, fitted with standard adaptive brake lights that flash rapidly whenever the driver brakes hard.

Even sharper: The S line exterior package

Thanks to the S line exterior package, the Audi A3 Sedan looks better than ever. Its single-frame grille is high-gloss black. An integrated honeycomb structure and fog lights appear in the air inlets, which are bordered by powerful edges. When one admires the A3 from the side, the sill extensions are particularly eye-catching. A Platinum Grey diffuser houses a honeycomb insert and the exhaust system's tailpipes sport chrome tips. The door sill trims bear aluminium inserts with S line logos; S line badges adorn the fenders.

There are 16 paint colours from which to choose. The Audi exclusive customisation program allows quattro GmbH customers to have any possible paint job customised for them.

Audi A3 Sedan: External dimensions

Length	4,456 mm
Wheelbase	2,637 mm
Width	1,796 mm
Height	1,416 mm

The interior

Elegant, refined, clear: the interior of the Audi A3 Sedan mirrors the styling of the exterior. A long, continuous curve spans the windshield from door-to-door. Known as a wrap-around, this feature also appears in Audi's large model lines. A sleek instrument panel, taut at the front, oozes roominess.

Both front seats in the A3 Sedan provide excellent support thanks to precise settings and ergonomic contours. The centre armrest is adjustable. Upon

request, Audi will include electric lumbar supports, electric controls and sports seats. In fact, sports seats are standard in the Ambition equipment line. Depending on the steering wheel in question, it is fitted with three or four spokes, multifunction pushbuttons and S tronic shift paddles.

It is easy to read both large round gauges at a glance. Between them is the 3.5-inch screen of the driver information system (DIS). It displays important information, while the DIS's efficiency program advises the driver on fuel-efficient driving. The DIS also issues rest-recommendation alerts. A colour DIS screen is standard in the Ambition line; a monochrome version is available for the Attraction package.

As in all Audi vehicles, ergonomics in the A3 Sedan are clear and intuitive. Starting with the MMI radio package, the MMI operating system with an electrically telescoping monitor is standard; it measures either 5.8 or 7.0 inches diagonally, depending on the version. The MMI control panel has been placed atop the centre console for a clear and tidy layout. The electromechanical parking brake is operated by a button.

One of many interior highlights are three-dimensional decorative inlays. Options include two aluminium versions, a 3D-design "Black" and a 3D-design "Optic". The control unit for the optional deluxe climate-control system is mounted on a panel in Piano-finish black. The instrument cluster fascia is also black. In the Ambition line, many of the controls feature an aluminium-look finish.

Audi aesthetics: The air vents

Bearing a classic turbine design, four large round air vents are a feature typical of compact Audi models. Their air flow is adjusted by pulling on the central axis, which adjusts the air flow from broadly dispersed and draft-free to a focused stream. Turning the rings generates a fine, precisely-defined click.

Upon request, an LED interior lighting package will spruce up the interior even more with additional highlights. Small LEDs serve as reading lights and provide illumination in the doors, footwells and near the cupholders. Dome lights subtly illuminate the centre console.

The A3 Sedan’s interior colours match a given equipment package. With the A3 Attraction line, the interior is bathed in black or titanium grey; the interior of the sporty Ambition line is either all black or titanium grey. An Ambition option, the two-tone Audi design selection lasso brown exudes exclusivity.

Striking differences extend to interior materials, as well. The seats are upholstered in a combination of natural and man-made leather, or alternatively covered in Milano leather in black, pashmina beige, titanium grey or chestnut brown.

The A3 Sedan Ambition can optionally be ordered with the S line sport package, which bathes the interior and even the headlining entirely in black. A variety of materials is available for seat upholstery, including exquisite Fine Nappa leather. Silver seams accentuate the look and silver colour-contrasting stitching outlines the floor mats. Decorative inlays are made of brushed aluminium. A special sport steering wheel – with a flat-bottomed rim, and a shift knob covered with perforated leather round out the sporty package.

The Audi A3 Sedan offers plenty of room for five people. Thanks to the long wheelbase, entry is easy and there is enough legroom – even in the rear. The L-shaped head restraints hardly affect rear visibility at all in their retracted positions.

The boot offers a base capacity of 425 litres, which can be increased to 880 litres by folding down the split rear seat backs. The luggage compartment is level and the boot lid offers a wide berth for loading and unloading items. Audi can optionally supply a load-through hatch, a ski/snowboard bag and a reversible mat. The A3 Sedan can be rendered exceptionally practical by means of the standard cargo-storage set. This equipment package comprises a second electrical outlet, a multi-use fastener, a cargo net, bag hooks, storage nets on the backrests of the front seats and for the front passenger as well as a side shelf with adjustable net.

Uncompromising: Quality and lightweight excellence in the interior

Elegant, easy to operate and luxuriously finished: the air vents in the Audi A3 Sedan reflect Audi's uncompromising commitment to excellence. Each

air vent consists of more than 30 individual components – each of them manufactured and mounted precisely within hundredths of a millimetre.

Decorative inlays in a 3D-design “Optic” likewise boast extensive expertise. At the heart of such an inlay is a roof-like mount made of plastic. During the first step, this mount is wrapped in a transparent polycarbonate film. But first, a pattern consisting of tiny triangles is printed on the mount by means of the screen-printing method. The pattern is applied three times to the rear side and twice to the front side. This creates a graphic of remarkable three-dimensionality.

Via back injection moulding, securing points are then affixed to the rear of the substrate. Liquid polycarbonate is then re-applied to the front. Just five millimetres thick, this coating enhances the 3D appearance of the printed graphic while imparting an extraordinary glass-like appearance. The final step entails sealing the inlay with a UV varnish to permanently prevent yellowing and protect it against scratches.

Precise to hundredths of a millimetre: Precision in the interior

Audi devotes its complete attention to even the tiniest detail. The chromed ornamental ring on the shift knob, for instance, is fitted within hundredths of a millimetre. The window panes first shift forward into a guideway before travelling upward to create a perfect seal at the junction of the roof and the window channel.

Premium quality is a fundamental commitment at Audi. The B-pillar covers in the A3 Sedan’s interior are covered with fabric and fitted with coat hooks. The window frames are completely covered. Fabric coverings and leather trim never become creased; all seams are precise and flawless. This is true even in tricky areas of the steering wheel, where there is little space between spokes and the rim.

Audi does not cut any corners even in those places rarely seen by customers. The carpeting in the boot is not needled felt, but cut velour instead. Once the bonnet has been raised, a pneumatic spring keeps it stationary. The handful of welds visible in vehicle-body areas such as sill trims, the engine compartment or the boot reflect the very highest in welding precision.

Audi proves ultra-premium quality and ultra-lightweight excellence can co-exist. Indeed, engineers trimmed every superfluous gram from the interior of the Audi A3 Sedan. The seats, for instance, are very lightweight. Intelligent placement of control units significantly reduced the amount of wiring needed. The air-conditioning system and the blower motor have also been optimised to weigh less. The front-passenger airbag housing is made of plastic, and the bracket of the MMI monitor is magnesium.

Engines

Three re-designed engines are available for the Audi A3 Sedan: one TDI and two TFSI units. Their engine displacements range from 1.4 to 2.0 litres, with power output between 103 kW and 132 kW. Audi resolutely sticks to its downsizing commitment, as usual.

Substituting engine displacement with turbocharging boosts performance and fuel efficiency alike.

In this context, technologies from Audi's modular efficiency platform play a key role. The start-stop system, for example, relies on a high-performance Absorption Glass Mat (AGM) battery to reduce fuel consumption by 0.3 litres per 100 km. The innovative thermal management system ensures that the engine comes up to its operating temperature rapidly after a cold start – this shortens the phase of elevated friction losses due to viscous oil, and the car's interior warms up faster as well.

All three engine versions are installed as per the same configuration: tilted backward by 12 degrees with the intake side at the front. This advancement from the MQB modular transverse platform paired with the engine's compact layout made it possible to position the Audi A3 Sedan's front axle very far forward. This, in turn, has improved crash safety, the vehicle's design and the distribution of axle loads (59% of power to the front and 41% to the rear).

Audi's dedication to ultra-lightweight construction also extends to its engines. The re-designed 1.4 TFSI weighs a mere 107 kg .And the 1.8 TFSI barely weighs 140 kilograms – thanks in part to a thin-walled crankcase that

weighs 2.4 kg less than its predecessor. And, in the 2.0 TDI, relocating both balance shafts to the cylinder block saved 3.0 kg .

Audi A3 Sedan: engine line-up

	Displacement	Power output	Torque
1.4 TFSI	1,395 cm ^{3}	103 kW	250 Nm
1.8 TFSI	1,798 cm ^{3}	132 kW	250 Nm
2.0 TDI	1,968 cm ^{3}	110 kW	320 Nm

	0 – 100 km/h	Top speed	Consumption (ECE)	CO_2 emissions
1.4 TFSI	8.4 seconds	217 km/h	4.7 l/100 km	109 g/km
1.8 TFSI	7.3 seconds	235 km/h	5.6 l/100 km	129 g/km
2.0 TDI	8.4 seconds	219 km/h	4.5 l/100 km	118 g/km

Vigourous power: The 2.0 TDI

The 2.0 TDI has been overhauled. Its 110 kW of power output is paired with 320 Nm of torque between 1,750 and 3,000 rpm. The 2.0 TDI furthermore propels the Audi A3 Sedan from 0 to 100 km/h in 8.4 seconds en route to a top speed of 219 km/h .Its average fuel consumption is a mere 4.5 litres per 100 km and it emits
118 grams of CO_2 per kilometre .

A reduction in friction was prioritised during development of this two-litre diesel engine, which features a displacement of 1,968 cm ^{3} (bore x stroke 81.0 x
95.5 millimetres). The toothed belts for the camshafts and ancillary components run smoothly and quietly. The balance shafts, relocated from the oil pan to the crankcase, boast anti-friction bearings and are lubricated by an oil mist. Elaborate needle bearings are used for the drive wheels of the camshafts, as well. The shafts are pressed into a separate bearing frame; a new valve train module exhibits high rigidity and low weight.

At the pistons, reduced stress on the rings results in smooth running. In manufacturing the engine, a honing process in fine machining of the cylinder liners guarantees high precision. The oil pump, with its two-stage control, requires very little drive energy. The cylinder block and the cylinder head have discrete coolant circuits supplied by dedicated pumps. During the engine's initial warm-up period, only the cylinder head's circuit operates.

The common-rail injection system in the 2.0 TDI generates up to 1,800 bar of pressure; eight-hole injection nozzles nebulise the fuel. A turbocharger with adjustable vanes is operated pneumatically. An intercooler is integrated

in the intake manifold, facilitating short gas-travel paths, good control quality and high efficiency ratios. A new low-pressure, exhaust-gas recirculation system which is located near the engine is also very compact and designed to minimize friction losses.

With Cylinder on Demand: The 1.4 TFSI

In 2004, Audi became the world's first manufacturer to pair direct gasoline injection with turbocharging – and the abbreviation TFSI has stood for great output, terrific torque and low fuel consumption ever since. A shining example of all these attributes, the 1.4 litre version has been overhauled. Its 103 kW of power output is paired with 250 Nm of torque between 1,500 and 3,500 rpm. The 1.4 TFSI furthermore propels the Audi A3 Sedan from 0 to 100 km/h in 8.4 seconds en route to a top speed of 217 km/h .It averages 4.7 litres per 100 km ,corresponding to 109 grams CO_2 per km .

Regarding the ultra-lightweight character of the 1.4 TFSI engine – which features a displacement of 1,395 cm^3 (bore x stroke 74.50 x 80.00 millimetres) – the single largest role is played by the crankcase. Unlike its predecessor made of cast gray iron, this die-cast aluminium innovation weighs a mere 18 kg instead of 33 kg .Additional improvements made to the crankshaft, connecting rods and elsewhere have reduced the overall weight of the engine to 107 kg .

Frictional losses have been reduced by as much as 20 percent compared with the previous engine. Improvements concern the piston rings, their reduced diameter at the crankshaft main bearings, lighter valves and toothed belts for the timing and ancillary drives designed to last the life of the engine. The pressure-controlled oil pump also contributes to engine efficiency. Like the 2.0 TDI, the
1.4 TFSI has a valve train module with low-friction camshaft bearings, whereby these shafts are integrated directly in the cylinder-head cover. The intake camshaft can be adjusted by 50 degrees of crank angle.

Intelligent thermal management: The exhaust manifold

Another innovation is integration of the exhaust manifold in the cylinder head. It quickly brings the coolant to operating temperature after a cold start; only then does a thermostat in the new coolant pump module enable cooling of the crankcase. At full load – e.g. during very fast freeway driving – the cooling jacket reduces the temperature of the exhaust gases. This

eliminates the process of enriching the fuel-air mixture which would otherwise be necessary – which improves fuel economy significantly.

The aluminium pistons have also been redesigned. The nearly flat design of the piston heads is precisely tuned to the intake ports, which have likewise been redesigned. The five-port nozzles of the common rail unit facilitate up to three injections per power stroke. The turbocharger has shed 1.8 kg compared to the previous engine. Its new electric wastegate adjuster is very quick and precise, which significantly improves engine responsiveness. An intercooler integrated within the intake manifold accelerates generation of boost pressure.

A particularly intriguing innovation in the 1.4 TFSI is the cylinder on demand (COD) system. A similar version is found in Audi's large S and RS models. An advancement of the Audi valvelift system that varies valve stroke, it shuts down the second and third cylinders of the four-cylinder engine at low and moderate engine load during coasting. The system operates between 1,400 and 4,000 rpm and torques up to 100 Nm .Switchover lasts 13 to 36 milliseconds, depending on engine speed. This transition is accompanied by tweaks to fuel injection, ignition point and the throttle valve.

Valves are adjusted by sleeves, each of which has two different cam profiles. When these sleeves are axially adjusted on the camshafts by electromagnetically telescoping pins, something known as zero-stroke cam profiles rotate over the exhaust and intake valves. They do not actuate the valves, and the valve springs remain closed; at the same time, fuel injection is deactivated. In the active cylinders 1 and 4, on the other hand, efficiency rises, because their operating points are shifted to higher loads. As soon as the driver presses firmly down on the gas pedal, the cam units retract and the idle cylinders are reactivated.

Even with a 360-degree firing interval, the remarkably harmonized 1.4 TFSI runs very quietly and with little vibration, on account of modifications to the engine mounts, dual-mass flywheel and exhaust system. Fuel consumption as per standards of the ECE (Economic Commission for Europe) is reduced by some 0.4 litres per 100 km thanks to the COD system. Moderate driving can result in fuels savings as high as 20 percent.

High-tech engine: The 1.8 TFSI

The 1.8 TFSI showcases Audi's high-tech expertise via numerous innovations. Of the engines initially available for the A3 Sedan, this is the most powerful. Its maximum torque of 250 Nm remains constant between 1,250 and 5,000 rpm. Power output amounts to 132 kW. This four-cylinder engine also offers sporty performance, needing just 7.3 seconds to propel the A3 Sedan to 100 km/h before topping out at 235 km/h. Its average fuel consumption is just 5.6 litres per 100 km, which corresponds to 129 grams of CO_2/km.

One of the key innovations in the 1.8 TFSI is the addition of indirect fuel injection. During partial-load operation, it aids FSI direct gasoline injection. This system supplies fuel at the tip of the intake manifold to the tumble flaps, whereupon the fuel is intensively swirled with air. This enhances carburation, consequently reducing fuel consumption and particulate emissions. Direct fuel injection, which generates pressure as high as 200 bar, operates upon starting and at relatively high loads.

The turbocharger generates boost pressure very rapidly. Its notable features include an electric wastegate adjuster and a turbine wheel made of a new alloy that can withstand exhaust-gas temperatures nearly as high as 1,000 degrees Celsius. Audi engineers have pushed the envelope by optimizing charging efficiency in the combustion chambers. The intake camshafts and exhaust camshafts are adjustable. The Audi valvelift system switches, as needed, between two settings regarding lift of the exhaust valves. Scavenging losses drop as a result. As in the 1.4 TFSI, the 1.8 TFSI's exhaust manifold is integrated within the cylinder head.

Two rotary slide valves – housed in a single module and driven by a motor – regulate the thermal-management system of the 1.8 TFSI. They not only ensure that the engine oil is rapidly heated, but also maintain a coolant temperature between 85 and 107 degrees Celsius as per given operating conditions. Regardless of operating point, they strike an ideal balance between minimal friction and excellent efficiency.

Despite these new technologies, the 1.8 TFSI barely weighs 140 kilograms. This is due in part to a crankcase made of cast gray iron; its walls are just three millimetres thick. The pistons consist of a new high-strength alloy. The oil pan is lightweight plastic and many bolts are aluminium. Internal friction

is low thanks to a novel coating for the piston skirts, low-friction bearings for the two balance shafts and a narrower main bearing for the compact crankshaft. A regulated oil pump requires little energy itself and an electric system cools the piston heads with jets of oil.

Power transmission

The A3 Sedan is fitted a seven-speed S tronic as standard with the TDI and TFSI engines. As in all Audi transmissions, the gear spread is large. The lower gears have relatively short gear ratios, while the highest gear is comparatively long to reduce engine revs on long rural drives.

The seven-speed S tronic combines the convenience of a classic automatic transmission with the dynamics and efficiency of a manual transmission. It namely comprises two sub-transmissions, which are actuated by two multi-plate clutches. The large K1 clutch located on the outside directs the torque via a solid shaft to the gear wheels for gears 1, 3, 5 and 7. A hollow shaft rotates about the solid shaft. This hollow shaft acts on the gear wheels for gears 2, 4 and 6 as well as reverse. It is connected to the smaller K2 clutch, which is inside the K1 clutch.

Though only one subsidiary transmission is engaged with the engine at any given time, both are continuously active. For example, when the driver accelerates in third gear, the fourth gear is already engaged in the second sub-transmission. Shifts are performed by switching the clutches. This takes just a few hundredths of a second and happens without any noticeable interruption in propulsive power.

The seven-speed S tronic is just 37 cm in length and weighs some 70 kg .The two clutch mechanisms do not require an oil supply, which further boosts their already impressive efficiency. A regulated electric oil pump supplies the clutch and gear actuators.

Revs are somewhat higher in the automatic S mode, whereas D mode prioritizes taller gear ratios. When combined with the Audi drive select dynamics system (standard in Ambition), the S tronic includes a free-wheeling function in efficiency mode that further reduces fuel consumption. The driver can control the seven-speed S tronic via the selector lever. Audi

can install optional shift paddles on the steering wheel.

Outstanding traction: quattro permanent all-wheel drive

Audi offers the A3 Sedan with front-wheel drive and Quattro. The quattro permanent all-wheel drive system will be paired with the 1.8 TFSI engine. It features a newly developed multi-plate clutch that is hydraulic and electronically controlled.

In the interest of better axle-load distribution, the clutch is located on the end of the prop shaft and in front of the rear-axle differential. Inside is a package of plates that rotate in an oil bath. The metal friction rings are arranged behind one another in pairs. One ring of each pair is rigidly meshed with the clutch basket, which rotates with the prop shaft; the other ring is meshed with the output shaft to the rear-axle differential.

During normal driving, the clutch sends most of the engine's power to the front wheels. If the front axle loses grip, the clutch can steplessly redistribute torque to the rear axle within milliseconds. A piston automatically presses together the plate packages. The requisite oil pressure, generated by an electrically actuated axial piston pump, can reach nearly 400 bar. A pressure accumulator is no longer needed. Moreover, the clutch has shrunk and is 1.4 kg lighter than its predecessor.

Chassis

A complex design and sportily balanced tuning: the chassis of the Audi A3 Sedan raises the bar. It all starts with an optimized axle-load distribution, itself facilitated by the front axle also being located far forward, near the front end. The front suspension is a MacPherson design with wishbones underneath. The one-piece subframe and the pivot bearings paired with more robust engines are made of aluminium. These aluminium components collectively weigh 6 kg less than their steel counterparts. The front suspension has a track of 1,555 millimetres .A stabiliser bar is used for both front and rear axles.

A power steering system contributes to the Audi A3 Sedan’s excellent efficiency. Because the system’s motor is mounted directly on the steering rack, it consumes no energy during straight-ahead driving. Power-steering assistance varies in accordance with the vehicle's speed. Its ratio of 15.3:1 is sportily direct and the vehicle’s turning circle is just 10.9 metres . Electromechanical steering works closely in conjunction with three assistance systems: rest recommendation, Audi active lane assist and the park assist system.

As for the Audi A3 Sedan’s four-link rear suspension, its track is 1,526 mm . The swordlike trailing arms absorb propulsive and braking forces efficiently. The arms’ bearings are large and exhibit a relatively soft configuration, which enhances ride comfort. Conversely, three transverse links per wheel – designed to absorb lateral forces – are rigidly joined to the steel axle carrier for enhanced handling.

The rear-axle links are made of high-strength grades of steel; the wheel carriers are aluminium. The shock absorbers and the compact coil springs are kept separate, enabling excellent responsiveness and considerable capacity for cargo. Audi offers an optional sport suspension that lowers the body by 15 millimetres. This decidedly taut suspension is available by itself, or paired with 18-inch wheels as part of the S line sports package.

All tyres are distinguished by low rolling resistance and powerful performance. A tire-pressure monitoring system and a temporary spare wheel are standard.

Powerful brakes behind the large wheels provide a tautly sporty pedal feel for precise braking. The front discs are ventilated and, depending on the engine, are either 288 or 312 millimetres in diameter. The rear discs measure 272 mm. The electromechanical parking brake is integrated within the rear-axle braking unit. If necessary, the parking brake can double as an emergency brake. An optional hold assist system maintains brake pressure for a certain time even after the driver has taken his foot off the pedal.

Even more stable and even sportier: The electronic limited slip differential

Electronic limited slip differential is standard in every Audi A3 Sedan with front-wheel drive. A component of electronic stabilisation control (ESC), it makes handling even more agile, precise and stable. Upon detecting that the front inside wheel in a turn has been relieved too much, the system's control unit gently and precisely brakes said wheel. Excess torque then flows to the outside wheel. At the same time, surplus drive traction helps the driver gently turn the car into the corner.

The Audi drive select system (standard with the Ambition line) packs even more emotion into driving. The basic version of this system regulates the gas pedal, power steering and the S tronic. The driver can press a button to switch among five modes: comfort, auto, dynamic, individual and efficiency. In efficiency mode, the optional deluxe climate-control system, adaptive light, Audi pre sense basic and adaptive cruise control are operated with an eye on optimized fuel efficiency. Starting with the MMI Radio package, there is also an individual mode. It allows the driver to specify, within certain constraints, his very own profile of preferred settings.

Infotainment systems

Automotive infotainment also puts the A3 Sedan at the head of the field, showcasing the full extent of the brand's expertise.

Infotainment for the A3 Sedan was conceived as a set of modular components. It all starts with the standard Audi MMI radio which supplies sound to eight loudspeakers. It also features an electrically telescoping 5.8-inch colour monitor and the MMI control panel atop the centre console.

The top-of-the-line version MMI navigation plus with MMI touch features an internal flash-memory drive with 64 GB of storage capacity as well as a DVD drive, a radio with a triple tuner and eight loudspeakers. This version also boasts two memory-card readers, Audi Music Interface (AMI) and a Bluetooth interface for integration of mobile playback devices and smartphones. Whole-word voice input allows the driver to simply explain his destination – or effortlessly operate the phone and music playback using his or her voice. Last but not least, a speed-limit indicator reflects real-time data.

The MMI's central computer is housed in the glove compartment. It comprises two units: the radio car control unit and the MMX board (MMX = Multi-Media eXtension). One of the plug-in module's key components is a speedy T-20 graphics processor from market leader Nvidia's Tegra 2 series. This chip generates complex 3D images and handles all online, voice-input, media, navigation and telephone functions.

When the MMI operating system starts up, its 7-inch colour screen automatically emerges from the instrument panel. It provides truly crisp images in vivid colours thanks to its resolution of 800x480 pixels; efficient LEDs supply backlighting. Its layer of glass is united directly with the surface of the TFT screen by means of a special lamination process, which leaves no air gap. Premium smartphones are no different. The high-gloss black housing made of lightweight magnesium underscores its elegant look. Just 11 millimetres thick, it is as thin as a mobile telephone.

Clear and logical: The MMI terminal

The MMI terminal is used to control the numerous functions. The conventional wheel/pushbutton controller has been combined with the MMI touchpad to create the touchwheel. A touch-sensitive screen is atop the touchwheel. The driver writes letters or numbers on the screen with his finger and the system provides acoustic feedback after each character is entered. This, in turn, allows the driver to phone or provides him or her with navigational information.

A straightforward menu makes everything easy to use from day one. The touchwheel is surrounded by a Main Menu key and a Back key; four softkeys for navigating menus; and two rocker switches for navigation, phone, radio and media. The volume control knob can be used to skip tracks. Buttons, paddles, and rollers on the optional multifunction steering wheel can likewise control many functions.

A Bang & Olufsen sound system will appeal to discerning audiophiles. Installed beneath the driver's seat, its amplifier delivers 705 watts of sound via 15 channels to 14 active loudspeakers – among them a centre speaker and a subwoofer. The system uses a microphone to analyze unwanted noise in the car's interior and then adjusts accordingly. In combination with the MMI navigation plus DVD drive, music can also play in 5.1 surround sound.

The Bang & Olufsen sound system is also a feast for the eyes. Along the upper edge of the bass speakers in the front doors, a boomerang-like trim strip made of anodized aluminium bears a laser-etched logo of the Danish hi-fi specialists. Also located between the trim strip and the loudspeaker screen is a narrow light guide that radiates white LED light.

Driver assistance systems

Audi is leading the way when it comes to driver assistance systems, as well. Audi offers options for the A3 Sedan that are directly from the luxury class. The driver information system with rest recommendation is standard. Rest recommendation technology analyzes the driver's steering motions, among other things, at speeds between 65 and 200 km/h .If the system determines that the driver's attentiveness is declining, then it will recommend some rest by illuminating an indicator in the driver information system and sounding an acoustic signal.

The adaptive cruise control (ACC) is the most complex of the optional driver assistance systems. This radar-based cruise control system, whose sensor is at the bottom of the single-frame grille, maintains this sporty four-door model at a desired distance from the vehicle ahead. ACC also accelerates and brakes autonomously in many instances. The driver can choose from several settings regarding following distance and degree of control.

In combination with the S tronic, a stop & go function drops the lower limit of the ACC's control range to 0 km/h. When the vehicle ahead comes to a stop, the Audi A3 Sedan likewise stops. And after less than three seconds, stop & go gently accelerates the vehicle. If the A3 is equipped with the assistance package comprising several systems, then the ACC's control range increases to 200 km/h .

A second system, Audi side assist, helps the driver to change lanes. At speeds above 30 km/h, radar sensors at the rear monitor what is happening as far away as 70 metres behind the A3 Sedan. If Audi side assist considers a vehicle in the blind spot, or one that is closing quickly, hazardous regarding a lane change, then it will alert the driver by illuminating an indicator in the respective exterior mirror. If the driver nonetheless activates the turn signal

to change lanes, the indicator will become brighter and begin to flash quickly.

At speeds above 65 km/h, Audi active lane assist identifies lane markings on the road surface via video camera. If an A3 Sedan driver approaches a lane marking without activating the turn signal, then the system will gently intervene to coax the driver to remain in his lane. The driver can use the MMI to specify how quickly Audi active lane should intervene and whether or not the steering wheel should vibrate. If a driver selects the "early" setting, then the system will help the driver remain in the middle of his lane.

Audi offers various options that make parking easy. The high-end solution is park assist with selective display. It can back the A3 Sedan into parking spaces. If necessary, the park assist will make multiple maneuvers, forwards and backwards. The park assist system with selective display can be supplemented with a rearview camera.

The benchmark in its class: Audi pre sense

The safety system Audi pre sense constitutes yet another A3 Sedan technology that raises the bar in its segment. This system consists of several subsystems. Also available as a stand-alone option, Audi pre sense basic will intervene upon detecting an unstable driving situation via the sensors of electronic stabilization control (ESC). More specifically, it will pretension the front seat belts. If the A3 begins to skid, the system will close the windows and the optional panoramic glass sunroof.

Audi pre sense front

By means of warnings and targeted braking intervention, the safety system Audi pre sense front helps the driver avoid imminent accidents or at least keep any damage to a minimum. With the aid of a radar sensor integrated in the A3’s front end, this system continuously monitors the distance to the vehicle ahead. In a critical situation, the first warning consists of visual and audible alarms. If the driver still does not react, then Audi pre sense front briefly brakes the vehicle to jolt the driver into reacting.

If the driver does not brake sufficiently, then the system will automatically brake to the extent necessary to avoid a collision. If the driver does not react at all, Audi pre sense front will automatically decelerate the vehicle to grant the driver more time to react. The system furthermore assists the driver by

indicating whenever following distance does not suffice.

City Emergency Braking function

A supplemental feature of Audi pre sense front, the City Emergency Braking Function operates below 30 km/h .It employs radar sensors to monitor the area ahead of the A3. In case of an imminent collision with a moving or stopped vehicle ahead, the brake system will prep itself for intervention should the driver not react at all. If necessary, the City Emergency Braking Function will automatically initiate maximum braking. And if the driver does not depress the brake pedal enough, then the system will maximize deceleration.

If a crash does indeed occur, then the secondary-collision brake assistant will be activated. Standard in the A3 Sedan, it will, in certain situations, prevent the vehicle from rolling uncontrollably. This feature will also switch on the A3's interior lighting and hazard warning lights. If the A3 is equipped with Audi connect, then the secondary-collision brake assistant will even alert emergency services.

Production in Győr, Hungary

The Audi A3 Sedan rolls off the assembly line in Győr. This Audi site in northwestern Hungary is the world's largest engine-production plant. The TT Coupé and Roadster as well as the A3 Cabriolet have been assembled there for years. The company invested 900 million euros in Győr to create a cutting-edge automobile manufacturing plant with a complete process chain. Spread out over some 250,000 m^2, every single production step takes place here – from sheet pressing to final assembly. Audi Hungaria thus created 2,100 new jobs; suppliers and service providers have hired an additional 15,000 people.

At the core of this new facility lies the central building. It houses the Analysis and Pre-Production Centre, Quality Assurance and office space for 900 employees. The central building is situated between the press and body-manufacturing shop, paint shop and assembly line. A compact layout facilitates efficient communication.

A state-of-the-art industrial press known as Servo-PXL dominates the press shop. Driven by 14 electric servomotors, it generates 8,100 metric tons of clamping force. As its plungers decelerate while falling, this press recovers some of the energy expended – rendering it about 10 percent more energy-efficient than conventional units. Switching tools takes just three minutes, which also sets a new standard.

The new body-manufacturing shop is every bit as cutting-edge. In its ultimate configuration, this shop will rely on 563 industrial robots; 373 welding tongs;
289 geometry, process and handling units; 73 adhesive application systems; 20 welding and soldering systems; and seven folding machines. An in-line laser measurement system inspects the dimensional accuracy of vehicle bodies at
23 stations, while an ultrasonic imaging system conducts spot checks. As for high-precision joins and radii, the Audi A3 Sedan raises the bar.

Another innovation is the paint shop. Air-recirculation systems in the spray booths drastically reduce the need to heat and cool as well as humidify and dehumidify air, resulting in energy savings of some 60%. A device known as a dry separator filters atomized paint. And in the topcoat booths, a special apparatus removes solvent residues from exhaust air before the latter is discharged into the atmosphere. With the exception of clear coats, only water-miscible coating systems are used to paint vehicles.

At the energy control centre – which supplies electricity, heating, and air conditioning – Audi likewise prioritizes efficiency and resource conservation. A stand-alone building, the energy control centre is home to three gas-fired boilers and one block-type thermal power station. In the latter, a low-emission natural-gas turbine drives electric generators. Their waste heat is then used for heating. Moreover, the Győr site is supplied with district heat from an offsite cogeneration power plant. Numerous heat wheels throughout the site recover energy to boost efficiency. And the lines for power, natural gas, water, air and compressed air were laid in such a way to keep losses to a minimum.

Expansion of the Audi plant in Győr began in 2011, with the cornerstone being laid in July. It will boast a larger toolmaking facility and a new test track some 1,200 metres in length. With production facilities becoming operational in June 2013, Audi Hungaria Motor Kft. can also look forward to celebrating its 20th anniversary. Since being founded in 1993, the company has emerged as one of Hungary’s most important exporters and highest-revenue businesses. Audi Hungaria manufactured 1,915,567 engines and 33,553 vehicles in Győr in 2012.