

Audi Australia Pty Ltd
Product Communications
The Audi Building
895 South Dowling Street
Zetland NSW 2017

28 July, 2010

The new Audi A8

Summary	2
At a glance	5
Full version – Design	6
Body	10
Interior	16
Engines	26
Drivetrain	30
Chassis	34
Safety	42
Driver assistance systems	46
Infotainment systems	49
Equipment and trim	52

Summary

The new Audi A8 – The sportiest sedan in the luxury class

Fascinating sportiness, innovative technology and superior comfort: Audi is bringing the next generation of the A8 to the starting line. The new flagship demonstrates the brand's clear Vorsprung durch Technik with its light aluminium body, its powerful and highly efficient engines, the improved MMI control system featuring a number of innovations and an elegant interior with a craftsman's level of fit and finish.

The A8 also sets new standards of efficiency. The fuel consumption of each of the engines available has been substantially reduced by as much as 13 percent.

“The new Audi A8 is the sportiest sedan in the segment,” says Rupert Stadler, Chairman of the Board of Management of AUDI AG. “It combines numerous functions in a new and intelligent way. And it is unmatched in the stylistic elements and impression of the interior.”

The new luxury sedan, to arrive in Australian dealerships in September 2010, is a technical work of art combining sportiness and progressiveness. Its elegant and powerful body is an aluminium Audi Space Frame (ASF), weighing about 40 percent less than a comparable steel structure.

The new full LED headlights, which use light emitting diodes for all light functions, are a completely exclusive high-end solution on board the new A8. They give the luxury sedan an unmistakable appearance even in daylight and even more so after the fall of darkness. The revolutionary optics used in these headlights mean a departure from the tubular light modules commonly used today. The full LED headlights herald a new chapter in the history of lighting technology.

The interior enchants with even lighter lines, uncompromising quality of fit and finish and extraordinary attention to the smallest of details. The comfort on board is first class – from emotionally charged ambient lighting to the luxurious adjustable rear seats.

The Audi A8 combines a new level of technical intelligence with exemplary and easy operation. When combined with the standard navigation system, its Multi Media

Interface MMI includes a pioneering innovation: the MMI touch. This MMI touch system enables the driver to control many functions intuitively; for example, the navigation destination can be entered by tracing the letters on the pad with a finger. MMI navigation plus is networked in a novel fashion with the advanced driver assistance and safety systems. It reads the road ahead in the navigation data and provides this information to the control units for the automatic transmission, the headlights and the intensely refined Audi adaptive cruise control with stop & go function.

The improved intelligence of these systems allows them to recognise complex scenarios and make anticipatory decisions to support the driver. In many situations, the new Audi pre sense safety system can mitigate accidents and their consequences. Another novel addition is a night vision assistant that highlights detected pedestrians.

Up to 13 percent less fuel consumption: engines

The new A8 will initially be offered with one engine a 4.2 FSI with 273 kW.

By the end of 2010, a V6 3.0 TDI with 184kW will be introduced.

In Q1, 2011 a 4.2 TDI will join the range with 258 kW & 550Nm.

The output and torque of all engines have increased, while fuel consumption has decreased considerably – by as much as 22 percent thanks to intelligent efficiency technologies such as the recuperation system and the innovative thermal management.

The standard new transmission also plays a large role in increasing efficiency – the extremely convenient 8-speed tiptronic finely graduates its eight gears while achieving a large overall spread. Its control system is purely electronic, operated with an elegant selector lever and rocker switches at the steering wheel. The quattro permanent all-wheel drive has a distinct sporty and rear-end character. On V8 models, the sport differential dynamically distributes the forces between the rear wheels (option for V6).

The new A8 also documents its standing as the sportiest luxury sedan on the market in the chassis sector. The wheel control arms are made of aluminium. The adaptive

air suspension with controlled damping is standard equipment and is integrated into the Audi drive select dynamics system. The optional dynamic steering is a supplementary component.

A grand tradition: luxury sedans from Audi

Audi can look back on a rich history in the luxury segment. Audi and Horch, which was later to become its sister brand and at the time was based in Zwickau, Saxony, were already building large cars with eight-cylinder engines in the late 1920s. One of these was the Audi Type R, also known as the Imperator. Its 4.9 litre inline eight-cylinder engine generated 74 kW and 275 Nm of torque.

In 1988, Audi undertook a new and successful attempt to establish itself in the luxury class. The large sedan with the name V8 was equipped with an eight-cylinder engine initially produced 184 kW, which was increased to 206 kW in the second version. quattro permanent all-wheel drive – a first in the premium segment – was already standard.

The first-generation A8 (1994) marked the first use of the aluminium ASF body – a technological breakthrough – in a series-produced vehicle.

Audi further extended its lead with the second-generation A8 (2002) with the adaptive air suspension and the innovative MMI control system. The single-frame radiator grille – the new face of the brand – followed in 2003. The 2.8 FSI with the Audi Valvelift System for the variable control of valve lift improved efficiency even further. This version of the A8 set new standards, with its CO₂ emissions of 199 grams/km being best-in-class. Audi has been aggressively driving progress in the luxury class for many years now.

At a glance - The new Audi A8

Body

- Lightweight and yet ultra-strong aluminium body with ASF design
- Flowing design, optional full LED headlights

Interior and controls

- Luxurious interior with newly developed, spacious styling
- Craftsman-level fit and finish, emotionally charged interior lighting
- Advanced MMI control system, brand new MMI touchpad navigation system
- Valcona leather seats with 22-way adjustment, with optional ventilation and massage functions, and luxurious individually-adjustable rear seats (opt).

Safety

- New Audi pre sense safety system for mitigating accidents and their consequences
- Integral head restraint system protects upper torso and supports the head in an accident
- Electronic stabilisation program ESP with traction control and electronic differential lock
- quattro all-wheel drive active safety system

Infotainment and driver assistance systems

- Night vision assistant with pedestrian marking
- Adaptive cruise control with Stop & Go function
- Audi side assist and lane assist

Drivetrain

- Powerful 4.2 V8 FSI engine with direct fuel injection at launch, output of 273 kW and 445 Nm
- Fuel consumption reduced by 13 percent with enhanced performance
- All engines with recuperation system
- New 8-speed tiptronic as standard, shift-by-wire control
- Standard quattro all-wheel drive with Audi drive select and sport differential

Chassis

- Lightweight aluminium suspension
- Audi drive select dynamic driving system including adaptive air suspension and adaptive damping standard, optional dynamic steering

Full version

The new flagship from Audi - The Audi A8

Audi has launched the next generation of the A8 – the sportiest sedan of the luxury class easily sets new standards. Its elegantly styled body with the Audi Space Frame (ASF) is aluminium, the engines are powerful and highly efficient, and the power transmission and running gear combine dynamics with great comfort.

Its generous interior captivates with its luxurious appointments, newly developed MMI control system and handcrafted fit and finish. Innovative assistance and safety systems provide for even greater composure when driving. The new A8 is more prestigious, intelligent, dynamic and efficient, setting new standards in each of these areas.

Design

The sportiest car in the luxury segment and at the same time a finely cultured and supremely composed sedan– the new Audi A8 has many different facets. With its lean, athletic body and strong lines, the luxury sedan underscores Audi's leading position in automotive design.

5,137 mm in length, with a 2,992 mm wheelbase, 1,949 mm in width and 1,460 mm in height – the new A8 boasts generous proportions. It is longer and wider than both its predecessor and its competitors, while its height remains below that of its immediate rivals – the proportions follow the dynamic line. As with the model it replaces, Audi will also offer the new A8 in a second, extended wheelbase variant.

Audi design is always fascinating in its complex intelligence. With the new A8, the designers have refined the elements typical of the brand and brought them into an exciting balance. The result is an automotive personality with a strong presence – a flagship that represents the brand and its values at the highest level.

The outer skin of the new A8 is like a work of art. The coupé-like roof line with the shortened rear roof pillar lets the silhouette flow. Sculptured, generous surfaces convey composure and prestige contrast with sharp lines. The distinctive design realised with the lightweight material aluminium requires uncompromising

precision in all steps of A8 production – from the making of the dies to the stamping plant and body assembly to painting. Representing the cutting edge in many innovative technologies, the A8 demonstrates this through new and progressive design elements.

Strong character: the face of the new A8

The A8's single frame grille is the most prominent feature of its front end. The grille, as a distinctive design element, is presented in a new, more sculptured look that is more three-dimensional and richer in detail than before. With its slightly angular upper corners, it is neatly integrated in the front section, while the prominent horizontal braces emphasise the vehicle's width. Generous chrome applications underscore its elegance.

The combination of the grille, headlights and air inlets creates a characteristic face – the face of Audi in the luxury class. The large air inlets, each of which is likewise divided by two horizontal braces with chrome applications, emphasize the horizontal aspect of the front of the vehicle, while the bottom is realised as a subtle front splitter.

The hood is tautly contoured, with bold V-shaped lines extending forward to the nose. Its edge intersects lightly with the tops of the headlights, a device that is strongly expressive. A sophisticated setting emphasises the complexity of their technology and turns them into tiny works of art.

There are clear differences between the headlights of the various equipment levels. High-performance xenon plus units are standard for Australian spec, with an adaptive light system. Its control unit manages the swivelling modules so that they always deliver the perfect light for intersections, country roads and the highway. The driver can precisely tune the system's function via Audi drive select. The new all-weather light is integrated into the headlights and replaces the fog lights, whose traditional location in the air intakes is now occupied by the radar sensors of the optional ACC with stop & go function.

Another standard feature is the adaptive light system with continuous headlight range control. A video camera mounted in front of the inside mirror recognises preceding and approaching vehicles by their lights.

A computer adapts the vehicle's own light through a sliding range that always provides the maximum possible illumination.

A revolution in lighting technology: the full LED headlights

However, it is the new full LED headlights that are the A8's high-end solution – a technology Audi was the first to introduce worldwide in the R8 high-performance sports car. They give the A8 an unmistakable appearance even in daylight and even more so after the fall of darkness. With a colour temperature of 5,500 Kelvin, their light resembles daylight and thus is much less tiring to the eyes.

The LEDs are zero-maintenance and designed for the life of the vehicle. They also score points in efficiency with their minimal power consumption. The low beams, for example, consume only 40 watts per unit, a bit less than the already highly efficient xenon plus headlights.

The innovative technology of the full LED headlights led to a radically new and fascinating design. The low beams comprise ten individual lens modules extending through the headlight in a distinctive arc below the chrome contour known as the wing owing to its shape. Just below this is another arc of 22 white and 22 yellow LEDs for the daytime running lights and the turn signals. Their "thick wall" technology makes them appear to the viewer as homogenous, continuous strips of light.

Located above the wing are the high beams, whose light is generated by two powerful four-chip LEDs and a free surface reflector system. An assistance function switches between the low beams and the high beams. Additional high-output LEDs generate the highway light and the cornering light. A separate fan and heat sink moderate the temperature of each headlight unit.

Concentrated power: the side view

The side view of the new Audi A8 also gives the image of concentrated and forward-thrusting power –like an athlete tensing his muscles before the start of the race. The powerful hood and the cleanly balanced proportions of the cabin to the body of the vehicle evoke an image of sporty energy. Typically for the Audi line, the vehicle line makes up two-thirds of the height, with the remaining third falling to the greenhouse.

The shoulder line is unbroken extending back from the single-frame grille. A sharp, light-refracting edge emphasised by a large shadow contour extends from the corner of the headlight. The characteristic Audi tornado line represents sportiness, powerful dynamics and solidity. This edge extends just below the window sill and divides the surfaces. The line continues close above the wheel arches, giving the A8 a powerful appearance on the road.

The convex and concave surfaces below the Tornado line interpret the interplay of light and shadow and are statement of seriousness and timeless elegance. Proceeding downwards, the surfaces are framed by the dynamic line running above the side sills. It begins in front of the front wheel arches, rising as it goes, is interrupted by the rear wheel arches and once again sweeps sharply upward as it approaches the rear.

In contrast, the side sill, which is accentuated by a solid chrome strip, and the lower edge of the window are essentially horizontal. This interplay of lines gives the side view a tense character. Large wheels fill the widely flared wheel arches and reinforce the image of concentrated power. The base of the C-pillar sits relatively far back on the muscular shoulder of the body; a slight spoiler lip neatly integrated into the overall outline extends the trunk line visually.

The dynamic line running around the car and a distinctive chrome strip underscore the sedan's width. The diffuser forms the terminus to the road. Regardless of the engine installed in the new A8, the exhaust system terminates in two large, round tailpipes on both sides of the rear end.

72 light-emitting diodes per unit: the tail lights

The flat, broad tail lights produce a light pattern that is a characteristic Audi trait in its three-dimensionality and its unmistakable appearance. Its horizontal character underscores the width of the rear end. The diodes are chamfered inward; their outer section integrated into the fender, the inner section into the trunk lid. With the exception of the reversing light, the tail lights are made entirely with LED technology, with each unit containing 72 LEDs. The designers used a novel technology called chip-on-board LEDs, which can be packed tightly together with high precision, in many areas due to the limited amount of space available.

The tail lights, which consume only 9 watts per unit, form a trapezoidal contour that appears as an even, homogenous strip. Its upper segment is a light guide – a plastic tube; the lower section is a textured, reflective free-form surface. It is thicker than the upper segment to optically lower the centre of gravity of the A8's tail end. The turn signal is located on the upper segment of the tail light and forms a wide, horizontal stripe.

The five-segment brake light is located inside the trapezoid. When the new A8 decelerates strongly, the brake light flashes quickly to warn the traffic behind it, and the hazard warning lights are activated when the sedan comes to a stop.

Audi offers a choice of ten colours for the A8 – two solid finish and eight metallic, three of which are new: Ibis White, Brilliant Black, Ice Silver, Quartz Grey, Havana Black, Phantom Black, Night Blue, Impala Beige, Emerald Black and Oolong Grey.

Audi A8: Exterior dimensions

Length	5,137 mm
Width	1,949 mm
Height	1,460 mm
Wheelbase	2,992 mm

Body

Big, strong, stable and yet amazingly lightweight – the aluminium body of the new A8 once again sets new standards. Its low weight of 231 kilograms is a key factor of the high driving dynamics and exemplary efficiency of the new A8. In steel, the body would weigh about 40 percent more. Including its standard quattro all-wheel drive system, the A8 4.2 FSI weighs in at only 1,835 kilograms, well less than its competitors. Audi, the lightweight design pioneer of the automotive industry, once again demonstrates its leadership role.

Fifteen years ago, Audi introduced the technology of the Audi Space Frame (ASF) into production – with the first A8 generation. ASF has proven its merit outstandingly; and now Audi is again using it in a much more advanced form on its new model.

The structure of the ASF body follows bionic principles, i.e. it incorporates ideas from nature. Its frame comprises extruded sections and pressure diecast parts of aluminium; the aluminium panels – such as the roof panels and the side panels – are

joined by friction connections. Like the bones of a human skeleton, all components combine optimal function with low weight. The material is used only where necessary and always in a tailored configuration. Audi uses 13 different aluminium alloys in the new A8.

The combined weight of all the castings, most of which are made of advanced alloys, is three kilograms less than with the previous model. A particularly large component connects the side sills and the rear longitudinal member. Its complex geometry and wall thickness is derived from the know-how that Audi has gleaned over the years in which it has developed its large lead. Its ribs are also based on bionic principles.

The vacuum diecast components are used wherever high forces are induced locally and there is a need for versatility and design freedom. The A-pillar node is one such multifunctional component. It connects the longitudinal member, the windshield crossmember, the roof frame, the strut mount and the omega bracket in front of the footwell. Most of the 25 castings in the new A8 are manufactured using the very high-precision vacuum casting process.

3.20 metres long: extruded section as roof arch

The extruded sections also stand out with their design flexibility, with each one optimised precisely for its intended purpose. A classic example is the roof arch of the new A8. It is produced by hydroforming: The section is shaped by a liquid forced into it at high pressure. Its cross-section changes multiple times with smooth transitions over the 3.20 metre length.

Audi has increased the strength of the higher-strength body components in the new A8 by as much as 25 percent, thereby reducing both material thickness and weight by up to 20 percent. This achievement is due in part to an innovative composite material for the aluminium sheets called a fusion alloy, which alone saves 6.5 kilograms. 15 fusion panels are used for the load-bearing parts of the structure – the centre tunnel, the cross bracings in the floor, the windshield crossmember and in the area of the rear seats.

The core layer of the new material is made of an alloy having a tensile strength of more than 250 newtons per square millimetre – five complete A8s could be suspended from a strip of this material only 13 millimetres thick and 30 millimetres

wide. There is a cover layer on both sides, and each of the cover layers represents approximately ten percent of the total thickness. With a conventional aluminium sheet, this is roughly 0.2 millimetres for both together. The cover layer helps to ensure that the panels can be shaped easily in the press despite the high-strength core.

The most recent stage in the development of the ASF principle is the composite construction with extremely high tensile strength steel to further improve passive safety. Audi uses it in the new A8 in the area of the B-pillars, which are made of hot-shaped steel. The blanks are heated in a furnace to roughly 900 degrees Celsius during production and are fed into a hydraulic press immediately thereafter. Cooling tubes through which cold water flows are cast into the die of the press, and the panel is cooled to approximately 200 degrees Celsius. The martensitic structure that this produces has an extremely high tensile strength – 1,500 Newtons per square millimetre in the upper section of the pillars; somewhat lower in the lower section because this is where most of the energy is dissipated in the event of a side impact collision.

Many new methods: body construction

With the ASF skeleton of the A8, the steel B-pillars cannot simply be welded into the aluminium body. The two materials exhibit different degrees of expansion when heated, plus there would be a risk of contact corrosion at the joints.

Instead, self-tapping screws (flow drill screws) are used for a secure hold and the utmost precision. Installed by a high-speed robot working with high axial forces, the screws melt the material lightly and tap their own threads. A structural adhesive further improves the strength of the joint while simultaneously forming a separating layer and thus solving the problem of contact erosion.

The hot-shaped B-pillars make up 8 percent of the weight of the A8 body's material matrix, with most of the rest being aluminium. This breaks down as 35 percent panels, 35 percent castings and 22 percent extruded sections. The joining of these wrought components and the 251 individual parts comprising the body of the A8 is a high-tech process that was intensively refined for assembling the body of the A8.

Audi uses a wide variety of mechanical and thermal joining methods: 1,847 self-piercing rivets, 632 self-tapping screws, 202 weld points, 25 metres of MIG-welded seams (MIG = metal inert gas) and 6 metres of laser-welded seams hold the body together. Many of the joints are also reinforced with adhesive – there are 44 metres of bonded joints.

Laser welding is a special Audi domain. Because the seams exhibit high strength and rigidity, it can be used to join large panels to the structure. One area where laser welding is used is the 1.8 metre aluminium invisible seam on both sides between the roof and the side of the car. The finished seam is then smoothed with brushes. Unlike many of its competitors, the new A8 has no roof trim strips or visible joints – a major element of the elegance and feeling of quality typical of Audi.

The laser seam is an area at the focus of Audi's extraordinary precision during the design and body assembly processes – the maximum tolerance for the outer skin is only 0.1 millimetres.

The developers not only shaved every unnecessary gram from the ASF structure, they did the same with the add-on parts. The total weight of the front and rear bumpers and the radiator grille has been reduced by 300 grams compared to the previous model. The lower crossmember of the front end is made of a novel matrix of fibre reinforced plastic reinforced by three aluminium panels embedded in it. Weighing just 5.4 kilograms, the component weighs 84 grams than a solid aluminium solution and saves 2.3 kilograms over steel. Even the doors are particularly lightweight, thanks to a new, fully integrated concept for incorporating the window frames.

Superior acoustics: vibrational comfort

The ASF body demonstrates its superiority in every field of technology. The static torsional stiffness has increased by 25 percent compared with the predecessor, already a leader in the field; it forms the basis for the precise, dynamic handling. The dynamic torsional rigidity of the body improved 15 percent, while its lightweight quality – the relationship between weight, torsional stiffness and size – improved 20 percent.

The ASF principle ensures comfortably low levels of vibrations and impressive quietness on board for that typical Audi feeling. The development engineers for the

A8 targeted and minimised all vibration levels at the contact points between the passengers and the body – the floor panel, the seats, the steering wheel and the inside mirror. They also isolated the eigen frequencies – all of which are below 40 hertz – of the large components like the axles and the engine from one another to avoid resonances.

Considerable attention was focused on the sound radiation of the large sheet metal panels and on local rigidities. All points at which force inputs taken place when the car is in motion were reinforced to the necessary extent.

The front axle subframe, for example, distributes vibrations from the wheels through a framework structure of members and sections, thus significantly reducing tyre noise in important zones. Special bulkheads, coverings and foam layers ensure that the large cavities of the body do not begin to vibrate, and fine seam seals close joining sites and thus seal out airborne sound. Very sophisticated insulation measures in which a new, lightweight microfibre fleece plays an important role were also applied to the interior.

Slicing through the wind: aerodynamics

The A8 4.2 FSI version has a drag coefficient of 0.26, with the frontal area measuring 2.41 m². Laborious fine tuning reduced the drag coefficient compared to the previous model sufficiently to offset the increase in size. Low lift coefficients at the front and rear axles ensure confident stability at highway speeds.

A key portion of the development work took place in Audi's aeroacoustics wind tunnel. It is a high-tech workplace. Its rotors measure five metres in diameter and accelerate the wind to 300 km/h. Details such as the form of the exterior mirror can be traced back to here: A groove on the top of the housing and a deflector edge on the bottom ensure good airflow around the mirror and repel water drops so that the mirror stays largely clean when driving in the rain.

Another focal point was the flow of air through the engine compartment. The area around the grille is thoroughly sealed so that the inflowing air reaches the radiator with virtually no losses instead of becoming turbulent. Another major area of work was the underbody, the wheels and the wheel wells. A car produces 40 to

50 percent of its total air resistance in this area. The aeroacoustic wind tunnel with its rolling floor and the four small treadmills on which the wheels can turn provided insightful and detailed analyses.

The development engineers opted for a nearly full underbody panel that leaves only the exhaust system and the rear axle exposed. A NACA vent directs cooling air from the slipstream to the transmission oil cooler. At the rear of the car, a cover plate and the mufflers form a diffuser surface that rises as it extends rearward.

Fine tuning of the underbody improved the drag coefficient by somewhat more than 0.03, which corresponds to 13 percent of the total drag. The plastic underfloor panels also protect the sheet metal of the bodysell and the mechanical assemblies against salt, moisture and stone impact, and eliminate the need for a conventional PVC underbody seal.

Quiet at any speed: wind noise comfort

The luxury sedan also once again leads its class in wind noise comfort. At a cruising speed of 120 km/h, the noise of the slipstream is already the loudest sound source in the cabin. The Audi engineers adopted numerous detailed solutions to reduce it. A water-catching strip with a rounded leading edge, a complex door seal concept with three sealing lines and an acoustically comfortable sunroof all work together to reduce wind noise. The sunroof's wind deflector extends in two stages as a factor of driving speed to suppress whooshing noises and booming attributable to dynamic pressure.

The windshield of the new A8 also comes standard with special acoustic properties. It is made of composite safety glass, and a special intermediate film provides further insulation against noise. Noise-insulating side windows of dual-pane acoustic glass are available as an option. These reduce the interior noise level in the wind noise frequency range by up to 6 dB(A). The insulating acoustic glass (option) has an additional metal vapor coating that reflects the infrared component of sunlight, thus reducing heating of the interior.

The time-consuming fine-tuning in the wind tunnel greatly enhanced the efficiency of the new Audi A8. Compared to the first draft design, the aerodynamics engineers were able to reduce the drag coefficient by 0.05. In the EU driving cycle, this improvement saves nearly 0.2 litres of fuel per 100 km, which corresponds to a

good 4 g of CO₂/km. The effect is much more pronounced in everyday driving. At an average highway cruising speed of 130 km/h, it is good for savings of 1.3 litres per 100 km.

Audi regards the development of a new vehicle as a holistic mission, and efficiency and sustainability were also a central focus during the development of the new A8. One tool used by the engineers was the environmental balance sheet, in which the ecological effects of each process step were quantified in detail.

The overall energy balance sheet reveals that the new A8 achieves better results than its predecessor for the greenhouse effect, summer smog and CO₂ emissions. This balance sheet covers the entire life of the vehicle, from production of the materials to the recycling of the car. The critical segment is the usage phase, which accounts for 70 percent of the total CO₂. It is primarily the new engines and the technologies from the modular efficiency platform that have a positive effect here.

The lightweight aluminium used in the body is also far greener than steel with respect to CO₂. Although it consumes more energy during primary production, its major weight advantage offsets this disadvantage after only 50,000 kilometres of driving. When the vehicle reaches the end of its life, all of the aluminium components can be recycled using just a small amount of energy. The body of the new A8 now comprises 38 percent ecologically produced secondary aluminium.

Interior

The interior of the new Audi A8 is a 'wellness lounge' for the senses. With its generous spaciousness, clear, elegant styling and uncompromising, craftsman-like fit and finish, the interior is a stand-out feature of the A8. In life it is wider, airier and more open than its predecessor – a new lightness that manifests in numbers but much more so when experienced. Audi has once again set new standards in the luxury class when it comes to interior design, ergonomics and equipment.

The salient element is the "wrap-around" – a wide arch spanning the entire cabin. It integrates both the rear shelf and the instrument panel. The "wrap-around" forms an elegant beltline as on a yacht, putting the crowning touch on the concept of sinewy taut and wedge-shaped lines.

The large curve integrates the unusually sleek and low instrument panel. It begins well below the base of the windshield and angles slightly downward toward the seats. Although the seats in the new A8 are mounted sportily low, most drivers can see the entire hood thanks to the low front end for an impression of expanse and freedom. The cockpit comes standard covered with a softly padded synthetic leather material elegantly framed with precise, visible stitchwork.

The front of the instrument panel is shaped like a gentle wave flowing around the driver and the front seat passenger; its pronounced horizontal line underscores its width. It is animated, clean and lean. The trapezoid-shaped air intakes accentuate the new emotional design philosophy, as do the sinewy taut arch and wedge-shaped lines in the door panels.

The Audi brand's clear and intuitive operating philosophy is one of its classic strengths and reaches new heights in the A8. All important functions remained in their familiar places. The headlight controller is on the left; the switch for the emergency flashers in the middle. This switch is flanked by a strip of secondary buttons, at the centre of which is a high-quality GPS-updated analog clock with a black face. Located below the strip of buttons and behind a cover are the slots for the DVD player and the memory cards.

Zero at six o'clock: the instruments

The instrument cluster includes two large dials for engine speed and driving speed. Their red needles point to six o'clock when in the zero position and run up and fall back down when the car is started for a sporty look. With their black markings and clear, classic graphics, the instruments can be easily read at a glance, as can the kidney-shaped displays for the coolant temperature and fuel level at their edges.

The standard driver information system (DIS), which serves as a fully fledged control centre, has a new layout. The high-resolution display located in the centre of the driver's field of view between the instrument dials grew 40 percent from 5 to 7 inches (diagonal). It consolidates and visualises the numerous functions of the new A8 according to an easy-to-understand concept.

Temporary warnings and hints are displayed in the header. The main menu bar with tabs for vehicle functions, audio, telephone and navigation is permanently displayed here. The topic selected by the driver appears in the large field below. The status

line at the bottom of the display shows the time, the outside temperature, the gear selected and the odometer reading.

Operation of the DIS via the standard leather multifunction steering wheel also features new solutions. As before, two buttons and two press-and-turn roller controls are located in each spoke. The control fields are supplemented by two paddles delicately framed in chrome. The typical Audi levers for the turn signals/high beams, cruise control and windshield wipers are located behind the wheel.

The new Audi A8 is standard with a, leather-wrapped 3 spoke Sports multifunction steering wheel with shifter paddles. The steering wheel weighs 3 kilograms, of which the airbag accounts for roughly half. The steering wheel skeleton is cast from ultra-lightweight magnesium.

Highly precise, power tilt (50 millimetres) and telescope (60 millimetres) adjustment is standard and combined with an easy entry function where the steering wheel withdraws from the driver so that he or she can exit the vehicle. Every A8 also comes equipped with shift paddles for the eight-speed tiptronic. Mounted directly behind the spokes, the ergonomics are perfect. The left paddle shifts down; the right paddle shifts up. Options include a leather cover for the airbag cover, a heater for the ring and fine wood inlays. The engine is started using the standard start-stop button; the key can stay in your pocket.

Control and information centre: the MMI

The console on the centre tunnel is clearly separated from the instrument panel visually and forms its own volume. Wide-cut and slightly inclined, it is an ergonomically perfect control panel with clearly defined work areas. The new selector lever for the eight-speed tiptronic and the button for the electromechanical parking brake are located in the horizontal rear area. The control panel for the automatic climate control system and the terminal for the MMI operating and multimedia system are located on the inclined portion.

Since its debut in 2002, the Multi Media Interface from Audi has distinguished itself as the best user interface in its class. The new A8 features the next-generation MMI, whose development was shaped by numerous studies with customers from different parts of the world.

When inactive, the onboard monitor is retracted into the instrument panel, with only its top edge visible as a delicate trim strip. Switched on, it moves upwards in an elegant curve, nicely setting the scene for the system start. The large monitor with its eight-inch diagonal is extremely flat, and its frame gleams with black lacquer and solid aluminium.

Similar to the DIS monitor, the screen is divided into three sections. Two horizontal information strips include a large display area that presents the topic selected in vivid, elegant graphics. A new and intuitive logic has the important topic areas arranged around the main menu. Many A8 customers will familiarise themselves with the MMI through play because it is so fun to use, such as when it presents the cover of an audio CD on the monitor.

Haptic landscape: the control terminal

The control terminal features a clearly organised haptic landscape. To the left and right of the central rotary pushbutton are four soft keys used to navigate through the menus. The four adjacent hard keys control the following areas: vehicle settings, navigation, telephone and information. They are supplemented by a menu button and a back button. Audio is controlled via a separate block with five buttons and a dial for the volume. Added to this are six fixed radio station buttons. In the standard MMI navigation plus version, these are a virtual touch surface called the MMI touch.

A8 drivers can remain very relaxed while operating the MMI terminal.

Asymmetrically located on the centre tunnel, the selector lever of the eight-speed tiptronic is the ideal resting place for the driver's right wrist so that the hand can easily press and turn switches.

The A8 also raises the bar in the luxury class with respect to the quality of workmanship, another domain of Audi. The materials, their look, their haptics and the tight, precise tolerances between the components are the factors that create the overall impression through their harmonious interaction.

To achieve this fine feeling of craftsmanship, the designers chose the combination of top-quality materials. The air nozzles, for example, are partly chrome plated. The backs of the comfort seats have sickle-shaped inlays of fine wood framed in subtle chrome strips. Aluminium surfaces for the important controls are available as an

option. They feel authentically cool to the touch – a pleasure for the fingertips and a demonstration of the incredible attention that Audi dedicates to each and every detail. The start-stop button is one of these tiny works of art – it is lighted from within and the letters have been machined out of the metal with the utmost precision.

The attention that Audi devotes to all of the details in the A8 includes the wood veneers. The grains on all parts of the interior harmonise, the edges are hand-finished again after they have been machine-ground. All leather seams are impressively accurate – straight, even and parallel. The cover on the steering wheel is hand-stitched.

Precisely designed: operating forces and sounds

All of the switches move easily and without play. Their fine, quiet click is the sound of technical perfection, as is the rich, dark sound as the doors fall shut. The developers of the new A8 accurately defined all of the sounds as well as the required operating travel and forces to harmoniously round out the overall experience of the interior. Gaps – the be-all and end-all at Audi – are even and narrow. In many areas they are only as wide as necessary for the thermal expansion of the materials and not a tenth of a millimetre more.

Countless control elements in the interior of the A8 are finished in high-gloss black. Heavily used components are coated with a novel, UV-cured topcoat that makes them extremely resistant to scratching. A high-end coating called Cerapaint protects the aluminium doorsill trims. Less than two thousandths of a millimetre thick, it offers excellent protection against damage, repels dirt and is easy to clean.

Similar to its predecessor, the new A8 has two-piece inlays on the front of the instrument panel and in the upper section of the doors – a very elegant solution. The bottom elements come in high-gloss piano finish black, the top ones in flawless and deeply lustrous walnut, while the whole is accentuated by slim chrome strips.

Audi offers optional decorative inlays in brushed aluminium or fine woods – grey vavona, which comes from the West Coast of North America, beige fine grain birch or brown fine grain ash. A special highlight is the open-pored natural wood with the name fine grain ash balsamico brown – it feels just slightly rough when you run your fingertips across it.

Subtle elegance: colours and materials

As befits the A8 there is also a premium selection of seat coverings from which to choose. The standard seats are covered in Valcona leather. An alternative is natural Fine Nappa leather, which is particularly soft and breathable and has a fascinatingly authentic surface structure. The sports-look comfort seats feature quilted and perforated seat coverings, which Audi also offers as a combination of leather and Alcantara.

Another highlight is the naturally tanned and amazingly soft buckskin Nappa leather. It is available on the headrests, the gear selector lever and the centre armrest. The leather program offers a choice of seven colours: black, nougat brown, velvet beige, titanium grey, silk beige, mocca brown/balao brown and granite grey/brass beige.

Audi has established a special interior design world for fans of the unique. The Audi design selection balao brown combines the exclusive brown interior colour with special applications, such as contrasting white seams, a white headlining and inlays in open-pored ash and silver aluminium.

An array of premium features round out the offer, including the four-zone automatic climate control system, the comfort seats, the ambient lighting package and electric sun shades.

As is typical for Audi, a number of leather packages are available for the new A8. Customers can choose Fine Nappa leather in one of three different configurations. In the highest trim level, the Advanced leather package, the “wrap-around” is also embellished with leather. A supplemental Alcantara package includes the headlining, the pillars and the rear shelf.

Also available is an extended aluminium finish interior trim package, in which various components in the doors and on the instrument panel are adorned with chrome or aluminium – some brushed, and some polished. A stainless steel strip covers the loading lip of the trunk. A number of additional suggestions for leather and wood applications are included in the Audi exclusive program.

Highly emotional: the ambient lighting

At dark another high-end feature comes into play – the newly designed ambient lighting. Produced by light emitting diodes and controlled by complex electronics, the ambient lighting turns on when the A8 is unlocked remotely. Beginning at the driver's seat, it spreads through the cabin like a wave. As soon as a door is opened, it focuses on that area.

The standard ambient light package (V8) – sees LEDs also illuminate the headlining, footwells, door handles, reading and vanity lights as well as the tunnel, the door pockets, and the door sill strips; the centre console appears to float in the effective lighting. Light guides are installed in the doors, light strips are installed in the headlining. Many of these LEDs are two-coloured or three-coloured – the driver can use the MMI to choose between the colour schemes ivory, polar, or ruby/polar, and adjust the brightness in four zones separately or as a whole.

Three climatic styles and up to four zones: the deluxe automatic climate control system

Among the many sophisticated solutions in the A8 is the automatic climate control system. Its control unit is typical Audi – simultaneously functional, intelligent and elegantly designed – with rotary dials that turn precisely and click into place, with red and blue LEDs and a display for the temperature. All changes to the settings are displayed on the MMI monitor.

The automatic climate control system cools, heats and ventilates the cabin in four zones. Three climatic styles are also available – gentle, medium and strong – which change not only the fan speed, but also the type of air flow. An optional fourth variant for the cold time of year provides particularly intense heating of the footwell. Other nuances can be configured under the MMI “Vehicle settings” menu.

The system considers the position of the sun, uses moisture sensors to prevent condensation on the windows and enables virtually draft-free indirect ventilation through a screen on the top of the instrument panel. A residual heat function uses engine heat to keep the cabin warm while the A8 is parked, and an air quality sensor closes the recirculation flap when it detects pollutants in the outside air.

The automatic climate control system's ventilation module is extremely quiet thanks to low-vibration housings, elastic bearings and optimised fans. It is also extremely efficient. Its central component is an internal coaxial heat exchanger that combines low energy consumption with high cooling performance.

Systematic lightweight construction reduced the weight of the base version of the climate control system by more than 10 percent compared to the previous model. The full version of the system uses 25 servo motors.

First-class comfort: the front seats

Just getting in is comfortably spacious; the sound of the door falling closed inspires confidence. Sitting down makes the luxurious nature of the new A8 all the more apparent. The newly developed seats offer first-class comfort. They provide your body with perfect hold and guidance; the offset upper section of the seatback provides outstanding support for the shoulders.

The standard comfort seats offer exceptional luxury – 22 parameters can be adjusted to ideally match the seat to your body. The inclination of the head of the backrest, the depth of the seat cushion, the inclination and height of the headrest – which is equipped with side bolsters that can also be adjusted – and the width of the seat and the backrest can all be finely adjusted here. Like the four-way lumbar support, this latter function is pneumatic. The memory function is standard. Audi also offers optional comfort seats with a sporty look and top-stitched diamond patterns.

In addition to heating, there is also an option for three-stage ventilation using four small extraction fans. Another luxurious extra is the pneumatic massage function provided by no less than ten air chambers in the backrest. The driver and front seat passenger can choose from five different programs with varying intensities and target areas. One of them massages the entire back, and one focuses on the shoulder area.

Audi has greatly reduced the number of switches for adjusting the seats. All primary adjustments continue to be made using intuitive switches on the side of the console that mirror the shape of the seat. A separate multifunction switch with a rotary ring and four buttons controls the secondary functions, such as the side bolsters or the

massage function. Each step is visualised in high resolution on the large MMI monitor.

The Audi philosophy of luxurious travel also includes a generous supply of storage space. Two large compartments are located in the doors. The upper one has a cover and can hold a small umbrella; the open compartment at the bottom can hold a large bottle.

Another storage compartment ideal for a mobile phone or an iPod is located in the centre armrest. A large glove box, two compartments for glasses, a parking ticket clip, a net in the front passenger footwell and two cupholders round out the list of storage options.

The ultimate in luxury: the rear seats

As a large, luxurious touring sedan the A8 also treats its rear passengers on the highest of levels. There is abundant space here – the sedan has added 48 millimetres of wheelbase compared to its predecessor, and it offers best-in-class rear headroom. A power-adjustable rear seat is available as an option.

The outer rear seats can be adjusted in a variety of ways – length, inclination of the backrest, the angle of the upper backrest, the height of the headrests, and the lumbar support. A memory function is included, as is the means to adjust the front passenger seat from the back. Audi also offers a ventilation and massage feature with a choice of two programs.

The rear seat passengers enjoy superior climate comfort. Outlets in the footwell, at the end of the centre tunnel, and in the B-pillar linings provide them with air driven by a newly developed distributor with integrated fan. The four-zone automatic climate control system has a separate air conditioner that individually regulates the temperature of the air and distributes it. Its control panel is integrated into the folding centre armrest – together with the adjustment controls for the seats, the armrest turns into a luxurious command centre.

Audi also provides ample storage in the back. The centre armrest has a compartment and two cupholders; located behind it is the optional load-through hatch to the trunk with an integrated ski bag. The doors have large pockets, and the storage compartment in the centre console can accommodate a one-litre bottle.

Highly complex and smart: the network

The rear bench seat in the new Audi A8 is a high-tech component. As many as 15 control units are integrated into its rear wall. In the previous model, some of these were located in the walls of the trunk. The reason for this can be found in the layout of the highly complex onboard network – it has an H-shaped structure with the crossbar in the area of the back seats. The control units were located there to keep line lengths short.

A conventional onboard network in a large sedan comprises up to 1,500 individual wires and weighs roughly 50 kilograms. In the new A8, Audi reduced its weight by 8 kilograms despite the numerous new functions. The cross-sections of all the wires were minimised, and the main battery lead is made of aluminium rather than copper.

The electronic nervous system running through the new Audi flagship is so complex that it required a new architecture. Previously developers installed data bus segments to meet the steadily increasing communication requirements of the controllers. Audi is using the Flex Ray bus system for the first time in the new Audi A8, which makes the transmission of data between the individual control units significantly faster and more reliable.

Audi has developed strict rules and exacting tests for the robust design of the new bus system – typical for the brand. FlexRay proved from the very beginning of the development period to be extremely stable; not a single car was rendered inoperable as a result of a system fault.

Wide and spacious: the trunk

The new A8 offers 510 litres of luggage space, 10 litres more than in the previous model. The trunk is also laid out much more practically. Although shorter at 91 centimetres; at a best-in-class 104 centimetres, however, it has gotten much wider. The loading lip height of 69 centimetres is pleasantly low.

Four golf bags can be fitted crosswise; smaller objects are accommodated in the side compartments, which are secured by individual nets. Three lights, four spring-loaded chrome lashing eyes and high-grade piping framing the floorbed testify to

the high level of quality even in the trunk. A pretensioned spring automatically swings the trunk lid upward when it is unlocked.

Engines

Superior power and exemplary efficiency – the new A8 makes its Australian debut with a powerful V8 4.2 FSI engine. A 3.0 TDI quattro will follow by the end of 2010.

Audi uses new technologies from its modular efficiency platform in all engines. One of these is the recuperation system. Whenever the driver lifts off the gas or brakes, the intelligent management system slightly increases the voltage of the generator so that it recharges the battery, which features a particularly high cycle strength. Electricity is fed back during subsequent acceleration, and the engine has to use less power to drive the generator. The generator uses a novel water cooling system. More efficient than an electric fan, this alone brings a benefit of roughly 0.1 litres/100 km.

The innovative thermal management is another Audi advancement. It reduces fuel consumption by around three percent. Many car trips cover less than 15 kilometres, which is why an intelligent cold start and warm up program is so important.

In the new A8, electronically controlled valves completely disconnect the engine from the cooling system for a brief time following a cold start. This quickly gets the motor oil up to operating temperature and shortens the phase of elevated friction losses substantially. Once enough hot cooling water is available, the transmission oil for the eight-speed tiptronic is heated using a heat exchanger. A proprietary computer controls a multiplicity of actuators that ideally distribute the flows of heat between the engine, the transmission and the cabin in any situation – in the city and on the highway, in summer and in winter.

Efficiency in stop-and-go traffic: 3.0 TDI with start-stop system

The new 3.0 TDI is paired standard with a start-stop system. When the car comes to a stop at a traffic light or an intersection and the driver keeps the brake depressed, the system's control unit shuts down the engine. On a hill or a downgrade, the brake system maintains the brake pressure unless the slope is greater than ten percent. A

powerful starter restarts the engine quickly and conveniently as soon as the driver lets off the brake.

The start-stop system works with a particularly strong battery that continues to function even at very low outdoor temperatures. Only during the initial warm up period of the engine is the battery still inactive so that the motor oil, the coolant and the interior can be brought to temperature more quickly. The driver can deactivate the start-stop system at any time by pushing a button. In the standardized driving cycle, the start-stop system reduces consumption by roughly 0.4 litres/100 km or around 8 grams of CO₂/km. The increase in efficiency is even more pronounced in everyday driving. The majority of the high percentage of short trips mentioned above take place in city traffic.

Trim and strong: the 4.2 FSI

The 4.2 FSI draws 273 kW of power from 4,163 cc displacement, generating its maximum of 445 Nm torque at 3,500 rpm. It accelerates the A8 from zero to 100 km/h in 5.7 seconds on its way to an electronically governed top speed of 250 km/h. In the EU cycle, the powerful gasoline engine is content with 9.5 litres/100 km – a reduction of 1.4 litres or 13 percent compared to the previous model despite a 16 kW increase in power. The CO₂ emission rate is only 219 g/km.

Like all of the engines in the new Audi A8, the 4.2 FSI is a long-stroke model with a 90 degree cylinder angle and a cylinder spacing of 90 millimetres. A two-stage chain drive, placed at the back of the engine to save space, drives the four camshafts, which can be continuously moved through 40 degrees of crankshaft rotation to ideally fill the combustion chambers. A fourth, particularly quiet running chain drives the ancillaries.

New triovals – minimally triangular chain wheels – allow substantially lower tensile forces. They therefore contribute every bit as much to the reduction of internal friction as the regulated oil pump that switches between two pressure stages as a function of engine speed and load. The driver of the A8 can check the motor oil level at any time in the MMI.

The cylinder case of the 4.2 FSI is made of a lightweight aluminium/silicon alloy. The cylinder barrels are finely honed by exposing the hard silicon crystals. An

improved method and optimised piston rings also reduce friction here. The lands between the cylinders are only 5.5 millimetres wide. The V8 is unusually trim, weighing only 197 kilograms, which has a positive effect on the total weight of the A8 and on the distribution of axial loads.

Like all gasoline engines from Audi, the V8 also uses FSI direct injection. The plastic intake manifold switches between two stages; pneumatically actuated flaps control its length and the tumble. The newly developed injectors of the common rail unit inject the gasoline into this roller-shaped movement of air at a pressure of 140 bar. It vaporizes on the walls of the combustion chamber, thus cooling them. This allows a high compression of 12.5:1 for greater efficiency. All of this activity is managed by a state-of-the-art engine management unit.

The V8 has an appealing, very cultivated sound throughout the entire speed range. Among the many measures employed by Audi to further improve the acoustics is a torsion damper that decouples the drive for the air conditioning compressor. Pressure losses through the engine's airways were minimised – from the new dual admission tract at the front of the vehicle to the exhaust system, whose backpressure has been reduced by 20 percent. The two catalytic converters sit directly behind the exhaust manifolds so that they quickly commence operation after the engine is started. The entire exhaust system weighs eight kilograms less than in the previous model, with higher-grade steels that get by with thinner walls making the difference here.

A whole new level of efficiency: the new 3.0 TDI

By the end of 2010, the V8 engine will be joined by a six-cylinder 3.0 TDI. It is new from the ground up – all that was carried over from the previous version of the engine are the 90 degree V, the cylinder spacing of 90 millimetres, and the displacement of 2,967 cc. All major components are new developments, from the cylinder block to the crankshaft and the connecting rods to the cylinder heads.

Like the eight-cylinder engine, the V6 diesel, which now also operates at an ignition pressure of 180 bar, also combines strong performance with exemplary efficiency. It produces 184 kW from its 2,967 cc displacement and delivers 550 Nm to the crankshaft at 1,500 to 3,000 rpm – increases of 13 kW and 100 Nm.

Consumption, on the other hand, decreased by 1.9 litres, or 22 percent, to 6.6 litres/100 km. The 3.0 TDI has CO₂ emissions of only 176 g/km – easily best in the segment. The V6 diesel accelerates the new Audi A8 from zero to 100 km/h in 6.6 seconds and to a governed top speed of 250 km/h.

An important development priority was the reduction of weight. The new V6 weighs only 194 kilograms, a full 23 kilograms less than its predecessor. The development engineers saved six kilograms with the crankcase alone – which like in the V8 TDI is made of vermicular graphite cast iron – four kilograms with the cylinder heads, and 2.5 kilograms with the crankshaft. The bolts and water pipes are made of aluminium instead of steel; the oil pan is made of magnesium and aluminium.

High-tech machining: laser exposure and plate honing

The 3.0 TDI is not only lightweight, it is also low friction. Audi uses two high-tech methods during its production – the laser exposure of the cylinder barrels and a new solution called plate honing, in which a plate is bolted onto the crankcase prior to the mechanical honing of the cylinder barrels. This simulates the pretension that the cylinder head will later exert late and which results in the minimal deviations from perfect roundness. This effect is then accounted for during honing, which is why Audi can fit the pistons with more slender rings that exhibit lower preload forces.

Additional measures for reducing friction target the chain drive. Two chains are enough to drive the four camshafts, the balance shaft, the oil pump, and the common rail system's high-pressure pump. The previous engine still used four chains and a toothed belt.

The injection system, which likewise uses piezo injectors, is particularly efficient thanks to a new pump concept. Located in the air intake module is a central swirler flap that replaces the separate swirler flaps in the intake ducts that swirl the air and thus improve torque development at low engine speeds.

The single flap keeps pressure losses during intake low. The exhaust system and the charging air path of the turbo were also designed for low-loss flow. The mounting of the compressor shaft in the water-cooled turbocharger was remounted. The low-

friction grooved ball bearings provide for snappy response, particularly from low speeds.

The new 3.0 TDI also has Audi's innovative thermal management system on board – a particularly advanced version of it. The crankcase and the cylinder heads each have their own cooling water loops connected to one another via a valve. During the warm up phase, the coolant in the block is not circulated. This brings the engine oil up to temperature quickly, in part because its oil cooler is bypassed during this phase. Water can often be left standing in the crankcase even when the engine is operating at low loads.

The coolant circulating through the heads heats the cabin and also feeds the cooler of the exhaust gas recirculation system, a high-performance component. The new exhaust recirculation concept is another module of the 3.0 TDI's efficiency package – the predecessor engine still used an electric coolant pump, which is no longer needed.

The drivetrain

The new Audi A8 offers the utmost superiority and the latest technology in power transmission. All engine versions come standard with a new, eight-speed tiptronic electronically controlled with an innovative selector lever and quattro permanent all-wheel drive. The dynamic sport differential is standard.

The eight-speed tiptronic is a torque converter transmission that has been newly developed from the ground up. Its key strength lies in the high overall gear ratio of 7.0:1 between the shortest and longest gear ratio. The A8 accelerates dynamically when starting off; it rolls along the highway with low, consumption-reducing engine speeds in the two highest gears.

The new transmission reduces fuel consumption by roughly 6 percent over the six-speed tiptronic in the previous model. Its eight speeds keep the jumps in engine speed between gears low, and the engine always runs in the vicinity of its ideal operating point. Gear changes are very gentle, almost imperceptible to the driver. They are snappy, fast, and very flexible. It is even possible to perform a kickdown by shifting directly from eight gear into fourth.

Thanks to the novel design of the gears and switching elements of the eight-speed tiptronic, it requires less space for installation than the unit used with the top two engines in the previous model and has fewer distinct individual parts. Like in many Audi models, the differential is installed in front of the torque converter. This shifts the front axle far forward, bringing the advantages of a long wheelbase and a well balanced weight distribution.

The newly developed, hydraulically damped centre differential contributes to the high level of vibrational comfort on board the new A8. Its back end rests against the tunnel crossmember. It is made of aluminium. The front of the tiptronic and also the engine are connected to the front axle frame by means of two hydraulic bearings. Thanks to a special circuit, the damping of the four bearings is particularly soft when at idle.

Greater efficiency: the transmission heating system

The 8-speed tiptronic achieves a high level of efficiency. One of the reasons for this success is the highly efficient vane pump for supplying oil, another is the heating of the oil following a cold start. Once the engine has heated enough cooling water, a valve in the loop opens and the hot water flows on to the transmission oil heater, which reduces the friction losses due to cold oil.

The torque converter lockup clutch and the integrated damper also play an important role in the efficiency concert. The lockup clutch is closed during normal driving, connecting the transmission directly to the engine. It works with limited slip in certain situations, which in conjunction with the damper precisely tuned to the engine permits very low engine speeds without vibrations.

When the A8 comes to a stop, an internal clutch separates the transmission from the engine, even if D is still selected. The torque converter therefore is not working against a stationary turbine which is more efficient with respect to energy. The clutch reengages as soon as the driver releases the brakes.

Slightly different variants of the eight-speed tiptronic are available depending on the engine. When used with the 3.0 TDI, it also includes a small, permanently full hydraulic accumulator on board to ensure start-stop functionality. When first started, the oil that it contains – roughly 100 millilitres – is forced into the actuating elements required for startup by a spring tensioned piston. The transmission is

operational within a very short time, much faster would be possible without the accumulator.

The DSP dynamic shift program that controls the transmission features a new, faster processor and is located in a small steel box inside the control unit for the tiptronic. In mode D, the DSP prefers high gears and low engine speeds in the interest of efficient driving; in the sporty S mode, it stays in the gears longer during acceleration.

The redesigned selector lever on the centre tunnel is used to choose the driving modes (P, R, N, D, and S). Shaped like the thrust lever on a yacht, it is one of the highlights of the sedan's elegant interior. Its grip can be optionally covered with leather or wood. Black high-gloss paint and narrow trim strips set fine accents. On the left of the lever is an LED indicator for the driving program, plus the shift pattern appears on the multifunction instrument when the driver presses the release button on the lever.

The lever communicates with the transmission electronically (shift-by-wire); the previous mechanical connection has been eliminated. The driving programs are selected by a brief tap of the lever forward or back, after which it automatically returns to its centre position. The lever moves smoothly and precisely. This enables the proven operating logic of the driving modes P, R, N and D and thus the intuitive operation to be retained, while the short shift travel together with the concise increments set an additional sporty accent.

The transmission automatically sets the parking lock when the engine is shut off, relieving the driver of yet another small bit of work. Gears can also be shifted manually using the standard paddles on the steering wheel.

Permanent advantage: quattro all-wheel drive

quattro permanent all-wheel drive is a major reason for the head start that the A8 enjoys over its competitors. It provides for reliable traction and directional control, and lays the foundation for dynamic handling and uncompromising road stability under all weather conditions.

The heart of the quattro drivetrain is the mechanical centre differential that reacts virtually instantly and distributes the power to both axles. With the

asymmetric/dynamic standard distribution, 60 percent flows to the rear differential and 40 percent to the front differential – a sporty characteristic. The mechanical centre differential senses the torque, and instantly and automatically transfers most of the power to the axle with the better traction as needed. Up to 80 percent can be directed to the rear wheels and up to 60 percent to the front wheels.

The principle of lightweight construction was also applied to the cardan shaft. It is connected to the centre differential by latching into a clamp connection. This solution saves 1.3 kilograms of weight compared to the conventional flanged joints while also providing for the smooth transmission of torque and high rigidity. An auxiliary shaft runs from the front end of the centre differential and along the right side of the eight-speed tiptronic to the front differential. It is inclined slightly and therefore has a very sophisticated system of teeth. Audi has also reduced the weight and internal friction of the cardan shafts for the front axle.

Cornering as if on rails: the sport differential

The housing of the rear differential and the frame that connects it to the rear axle subframe are cast from aluminium. The innovative sport differential from Audi distributes the drive power in continuously variable proportions between the rear wheels.

With the active sport differential, Audi elevates the driving dynamics and traction of the quattro permanent all-wheel drive system to a level previously unheard of in the luxury class. The vehicle remains sportily neutral when at higher speeds, the vehicle reacts more directly to steering input and the vehicle is stabilised in the event of load changes. This not only makes the car more fun to drive, it also allows greater lateral acceleration in curves and substantially reduces the driver's steering effort.

The foundation for this torque distribution is a high-tech rear-axle differential. The conventional rear differential was expanded to include a superposition unit comprising two internal gear stages mounted on the left and the right.

An electrohydraulic actuator operates a multi-plate clutch running in the oil sump which interconnects the internal gears. When the clutch is engaged, the driven wheel is accelerated a maximum of 10 percent by the superposition unit and thus receives an additional torque. This is drawn from the opposite wheel via the

differential. In this way nearly all of the torque can be directed to one wheel. The maximum difference between the wheels is 1,800 Nm.

When turning into or accelerating in a curve, it directs the majority of the torque to the outside wheel, pushing the new A8 into the curve. The system nips any tendency toward oversteer or understeer in the bud. With a short reaction time of less than 100 milliseconds, it is even faster than the ESP stabilisation program; it reacts just as effectively while accelerating as it does when coasting and is even active at zero load.

The secret to the effectiveness and fast reaction speed of the sport differential lies in the carefully matched interaction between the software, the electronics and the mechanical components.

The software was developed in-house for that typical driving feel. The controller quickly and constantly recalculates the ideal distribution of the forces for each driving situation as a function of the steering angle, yaw angle, lateral acceleration, speed and other information.

The sport differential is integrated into the Audi drive select system; the driver can adapt its characteristic suit his or her individual wishes. The “comfort” mode prioritises road safety and stability. “Auto” mode represents a balanced setup, whereas in “dynamic mode,” the sport differential is particularly nimble when cornering and in transition curves.

Chassis

The new Audi A8 is the sportiest sedan in the luxury class – and its chassis is largely responsible for this. It combines uncompromising precision with great dynamism, superior stability, and excellent comfort. The adaptive air suspension including controlled damping and the Audi drive select dynamics system comes standard, with Audi offering dynamic steering as an option.

Even when standing still the new A8 clearly expresses its most important trait: The wide track, the large wheels and the long wheelbase convey a powerfully sporty image. In motion the large sedan impresses with its sprightly agility. The A8 steers spontaneously and willingly, remains nearly neutral at the limit and finds strong traction when exiting curves thanks to the power delivered to all four wheels.

Shifted forward: the front axle

The Audi engineers shifted the five-link front axle forward by 145 millimetres compared to the previous model. The result is a well-balanced distribution of vehicle weight between the front and rear axles, with the rear-axle differential in the quattro drivetrain and the battery located in the trunk contributing to this balance. The 1,644 millimetre front track of the new Audi A8 is far wider than those of its competitors.

The integral subframe for the engine and the front axle, which is made of high-strength steel and is reinforced with X-shaped braces, forms the backbone of the front suspension. Because it is rigidly bolted to the front end of the car, it becomes part of the body. The high rigidity ensures that steering forces develop without delay.

The bearing pedestal, which is likewise integrated into the body and connects the upper control arms, and the pivot bearing are made of aluminium. A complex casting process ensures that the bearings are of the highest strength yet low weight. A monolithic, die-cast strut brace connected to the body at seven points further improves the rigidity of the front of the car.

The front suspension comprises five links per wheel – two transverse links on the upper plane, the support link and control arm in the lower plane and the track rod. All suspension control arms are forged aluminium parts, guaranteeing low unsprung masses, extremely precise wheel location and safe crash behavior. The anti-roll bar fabricated from a high-strength tube also saves weight.

The five-link suspension can handle longitudinal and lateral forces separately. The bearings are rigid in a lateral direction to promote sporty precision. In the longitudinal direction, on the other hand, they have a supple, soft response thus unifying the dynamism of a sports sedan with the comfort of the luxury class.

The kinematics of the front suspension offers major advantages. They allow the camber and caster angles to be selected for precise centring of the steering when driving straight ahead, ensuring the sense of steering accuracy around the straight-ahead position. The arrangement of the control arms makes it possible to reduce the leverage exerted by driveline and external forces, so that the driver does not feel them at the steering wheel.

Precise and sensitive: the steering

The steering system used on the previous model was also extensively revised. The steering gear, which used to be installed on the bottom of the radiator tank, is now placed low and far to the front, below and in front of the centre of the wheel on the subframe. The steering impulse is introduced with great directness into the wheels through the track rods. Friction-optimised track rod joints increase the precision of the spontaneous response. The wheel bearing, which is also of a special low-friction design, has a large diameter of 102 millimetres that reduced the specific load, thus increasing service life.

The steering column is bolted in a rotationally fixed manner to the module crossmember below the windshield frame and the bearing pedestal of the bulkhead. The steering column dissipates energy in the event of a frontal collision, and a telescopic shaft prevents it from penetrating the cabin. It has also been optimised with respect to its eigen frequency.

The steering gear is a rack-and-pinion design with a casing of lightweight die-cast aluminium. With a ratio of 16.1:1, the steering is sporty and direct, communicating precise and finely differentiated feedback from the road in any situation. A controlled-output vane-type pump supplies the necessary hydraulic energy; unlike conventional power-steering pumps, which circulate a large volume of oil internally, it delivers only as much oil as is needed at any given operating point. This reduces the fuel consumption of the new Audi A8 by 0.1 litres/100 km.

All A8 versions leave the factory with servotronic power steering, which adapts its power assist to the speed being driven to further enhance both comfort and the sporty character. The steering is precise in all situations while at the same time communicating finely differentiated feedback from the road.

Dynamics and comfort: the rear suspension

Major elements of the rear suspension of the new Audi A8, which has a track of 1,635 millimetres, have been redesigned. Designed according to the track-controlled trapezoidal link principle, it combines compact design with superior performance and comfort qualities. The overall kinematics greatly suppress dive and pitch while braking and accelerating, which also enhances the sporty dynamics.

Unlike in the previous model, the struts no longer rest against the upper transverse links, but rather directly on the wheel carriers. This allows a 30 percent higher damping ratio so that the dampers react with greater sensitivity. The developers were also able to redesign the axle beam bearings to be more comfortable. Elastic bearings connect the wheel control arms to the axle subframe. With their high damping rate rubber mixtures, they play a major role in bringing comfort and dynamics together.

The developers also kept the unsprung masses as low as possible at the rear axle. The two trapezoidal links in the form of hollow sections are warm-hardened aluminium castings; the wheel carriers are of chill-cast aluminium. The top transverse links and the track rods are aluminium forgings. Their high rigidity ensures that toe and camber angles change very little when dynamic forces act on the wheels. The stabiliser bar, which is also tubular, also combines great rigidity with low weight.

The bending and torsionally rigid subframe comprises two longitudinal and two transverse tubes of higher-strength steel shaped using extremely high water pressure. Four hydraulic bearings connect the subframe with the body. They are particularly firm in the transverse direction for sporty handling, but have a soft response vertically and longitudinally in the interests of comfort.

Incredible range: Audi drive select

Audi drive select lends an incredible range to the experience of driving in the new A8 – from highly comfortable to sporty and taut. It integrates the adaptive air suspension, the engine, the eight-speed tiptronic, servotronic and Audi pre sense basic. The system modifies the characteristics of the air springs, dampers, and the accelerator, and adapts the shift points, steering boost, and the trigger time for the reversible belt tensioners.

With the MMI the driver can change the characteristics of these modules between the comfort, auto, and dynamic modes at any time via the “Vehicle settings” menu. All adjustments are made safely and harmoniously; they make their presence known, but do not irritate. You can also compose your own “individual” mode – within certain reasonable limits – corresponding to your own personal ideal by choosing settings from the portfolio.

Audi drive select proves to be extremely versatile in the new A8. Customers can order a series of additional driving dynamic and lighting modules. Two optimal components in terms of driving dynamics are already available – the sport differential for the variable distribution of power between the rear wheels and dynamic steering.

Variable gear ratio: dynamic steering

Dynamic steering is a high-end feature that varies the steering ratio by nearly 100 percent as a function of driving speed and the setting in Audi drive select.

The central component is a superposition gear integrated into the steering column and driven by an electric motor – a harmonic drive originally developed for robotics and space flight applications. The unit is compact and light and reacts free of play, precisely, and with low friction. The harmonic drive can transmit immense amounts of torque and is very efficient.

The steering is extremely direct at low speeds, such as in city traffic and when maneuvering. The power assist is also high, making it very easy to maneuver the car into a parking space. At moderate highway speeds, the system becomes less direct and provides less power assist. At fast highway speeds, an indirect steering ratio and low level of power assist facilitate steady tracking.

The dynamic steering system cooperates closely with the ESP stabilisation program in the sportiness and safety areas. It even countersteers if necessary.

In most situations, its subtle interventions, which the driver often does not even notice, result in a load change that reduces understeer or oversteer as necessary. When the brakes are applied on surfaces with different coefficients of friction, the system actively intervenes with stabilising steering maneuvers so that track offset, stopping distance and the amount of countersteering required from the driver are minimised.

The dynamic steering needs less time for its corrections than the brake system needs to develop pressure at the wheels. In many situations it does most of the work and there is no need for the braking maneuvers or they serve only as damping to reduce speed. This increased driving safety and sportiness is particularly pronounced when driving at higher speeds on a slick substrate such as snow.

Sporty and very comfortable: the adaptive air suspension

The A8 comes standard with the very comfortable and yet sporty adaptive air suspension. When integrated into the Audi drive select system, this combines a high-end air suspension with controlled damping. It takes ride comfort to a whole new dimension – the new A8 reacts to irregularities in the road surface smoothly and confidently.

The air supply for the adaptive air suspension is located in the rear of the A8. The extremely quiet compressor generates 18 bar of pressure and fills a 5.8-litre cylindrical pressure vessel of aluminium. Control from the pressure reservoir substantially accelerates the level regulation processes.

There are many improvements that enhance comfort. The struts have been newly developed; their increased air capacity now allows a soft characteristic even without an auxiliary accumulator and a fine response even to slight irregularities.

Audi developed all of the damper control software algorithms internally. The driver can choose between four modes with the Audi drive select system. “Auto” offers balanced properties; damping is particularly soft in “comfort.” In both cases the body is initially set to the standard ride height when starting out.

In “auto” mode, the body is lowered by 20 millimetres when the A8 has driven for at least 30 seconds at a speed greater than 120 km/h. This increases stability and reduces wind resistance, thus saving fuel. The body is not lowered in “comfort” mode. In “dynamic” mode, on the other hand, the body is lowered 10 millimetres from the outset, with the ride height lowered another 10 millimetres when the switchpoint is reached. In the fourth mode, “lift,” ground clearance is increased 25 millimetres from the standard ride height so that smaller obstacles, such as unfavorable ramps, can be overcome. This mode can be selected at speeds of up to 80 km/h and automatically switches back to the last mode selected at speeds above 100 km/h.

The adaptive air suspension also serves as a high-tech level control and keeps the body at the ideal ride height at all times. Passengers enjoy a consistently high level of comfort regardless of the load. Audi also offers the A8 with an optional setup that emphasises dynamics. The adaptive air suspension sport lowers the ride height in standard mode by 10 millimetres.

The friction of the regulated dual-tube shock absorbers, inside which the air springs are located, was reduced by around 10 percent. The CDC dampers (continuous damping control) are hydraulic shock absorbers according to the dual-tube principle with controllable internal valves. Supplied with data from a complex system of sensors, the control unit adapts the function of the shock absorbers to the road conditions, the driver's style, and the mode specified in the Audi drive select system.

Individual adjustments for each wheel are made by the millisecond and virtually without delay via the control current for the damper valves. When driving quickly through a curve, for example, the computer reduces body roll by selectively increasing the damping force for certain wheels. During braking, it instantly hardens the shock absorbers to reduce dive and shorten the stopping distance. The dampers also effectively support the work of the ESP stabilisation program.

Steady and powerful: the wheel brakes

High performance demands composed braking. The new A8 comes equipped with a powerful and durable top-performance brake system that has been systematically designed for high heat dissipation and low weight.

The front and rear brake discs are internally ventilated. The front axle of the new A8 features discs measuring 356 x 34, 380 x 36 and 400 x 38 millimetres. Stainless steel pins connect the friction rings, which are made of a newly developed, high-strength cast iron material, to the lightweight aluminium brake caps – a concept from the sports car segment making its debut in the luxury class.

This reduces the weight and thus the unsprung masses dramatically, by as much as 4.5 kilograms depending on the size of the disc. The pins also prevent the transfer of peak temperatures to the brake caps. The elegant pins are visible when the A8 is stationary.

The rear axle of the A8 also sports large, internally ventilated brakes that measure either 330 or 356 millimetres depending on the engine. The electromechanical parking brake integrated into the calipers is quiet and lightweight.

Safe and agile: ESP

ESP makes a considerable contribution to the agile, sporty character conveyed by the new Audi A8. The stabilisation system uses a high-performance, six-piston pump that generates pressure dynamically and controls it precisely and comfortably, free of jolts and perceptible vibrations. The weight of the brake booster has been reduced by 30 percent compared to the previous model.

ESP offers a second mode – the sport mode. In this mode, engine intervention is largely deactivated and brake intervention somewhat reduced so that experienced A8 drivers can drive very dynamically on winding roads.

ESP also offers other functions. For instance, it stabilizes a trailer that is threatening to fishtail by braking the wheels of the A8 in a rhythm opposed to the oscillations. This intervention takes place in three stages depending on how critical the situation is.

The stabilisation system works very closely together with the dynamic steering, the damper control system and the sport differential. Audi has networked the chassis control systems of the new A8 in an innovative manner so that they now work faster and more closely together than before, with the ESP controller serving as the central integration platform.

The new A8 comes standard with a tyre pressure indicator that is also integrated into the ESP. This is a system that measures indirectly, has no sensors of its own and thus adds no weight and requires no maintenance. It displays a warning on the onboard monitor to inform the driver of a loss of pressure in one or more tyres. If only one tyre is affected, the position of the tyre is indicated. A warning is also given in the event of diffusion pressure losses, which lead to increased rolling resistance and thus higher fuel consumption.

This is possible because the tyre pressure monitor not only compares the speeds of the four wheels as measured by the ABS sensors, it also monitors changes in tyre vibration caused by stimuli from the road. In the event of a loss of pressure, the amplitude and eigen frequency of the tyre changes significantly, from which a change in pressure can be deduced.

Anyone looking for the ultimate in dynamic performance will find it at quattro GmbH, which offers 21-inch wheels. Audi delivers the 9 J x 19 wheels with 255/45 run-flat tyres upon request. Rubber elements in their interior allow them to be driven for at least 80 kilometres at not more than 80 km/h in the event of a loss of pressure. The Audi A8 has a tyre mobility set on board at no extra charge, and a 19-inch or 20-inch emergency tyre is available as an alternative. With the large tyres, a full-size spare tyre will be provided in the trunk upon request, but this reduces its volume by approximately 45 litres.

Safety

The new A8 is one of the safest sedans in the luxury class. It protects its passengers in new, highly intelligent ways: with a high-strength body, adaptive restraint systems and the new Audi pre sense safety system. It is available in a standard version and in three expanded levels. When designing this system, Audi tapped into its broad knowledge base that it had created itself: The AARU (Audi Accident Research Unit) investigates real-world accidents and analyses the relevant databases.

In the standard variant, Audi pre sense basic, the system utilises the information from the ESP sensors. When they signal a critical situation, such as skidding or maximum braking, the control unit intervenes. Depending on the situation, it activates the hazard warning lights and closes the side windows and the sunroof; it also partly or fully tensions the front seat belts. Small electric motors trigger this process, which is reversible – if the situation is averted without an accident, the belts are released again. Audi pre sense tensions the front belts every time the car starts – so gently that it is almost imperceptible.

The expanded levels of the new safety system are called Audi pre sense front, Audi pre sense plus and Audi pre sense rear. They are networked in a pioneering manner with the optional assistance systems Audi adaptive cruise control with stop & go function and Audi side assist. This makes their actions more differentiated and powerful than those of competing systems.

In finely tuned interplay with ACC stop & go, Audi pre sense front affords additional protection against rear-end collisions with moving vehicles, and supports the driver in three stages. If the luxury sedan is approaching a slower moving car ahead, a

warning gong sounds while a red signal lights up on the dashboard. Parallel to this, the brake system is prefilled and the air strut/damper suspension is set to hard. The warning – and that is the Audi philosophy – is intended to persuade the driver to brake himself or to make an avoidance maneuver, which is often the better strategy. At this point there is still plenty of time to do so.

If the person at the wheel remains passive, the acute warning is issued in stage 2 – a warning jolt produced by the rapid generation of pressure in the brake system and lasting approximately 0.5 seconds. The seatbelts are lightly tensioned at the same time. If the driver now depresses the pedal, the hydraulic brake assist system provides more powerful braking relative to the preceding vehicle. The fact that the system is already prefilled saves between 0.1 to 0.2 seconds, or more than seven metres at a speed of 130 km/h.

Should the driver also ignore the warning jolt, the third stage is activated – autonomous partial braking that initially slows the A8 at a rate of 3 m/s^2 . At this stage it closes the windows and sunroof and activates the hazard warning lights.

Collision mitigation: reducing speed by as much as 40 km/h

If the sedan is equipped with Audi pre sense plus, which is the full version of Audi pre sense, a fourth stage follows. After the autonomous braking at a rate of 3 m/s^2 , the braking force is increased to 5 m/s^2 if the driver remains passive and the belts are pulled tight. The last phase of braking with maximum deceleration begins about half a second before impact – at a time when a saving avoidance maneuver would no longer be possible. The force of the inevitable collision and its consequences are greatly reduced, for by impact the A8 has cut its speed by about 40 km/h – significantly more than the competition can.

Audi pre sense rear mitigates the consequences of a rear-end collision, computing in advance how severe the collision will be. Here, too, it closes the windows and sunroof and tensions the seat belts. If the A8 is equipped with seats with a memory function, the upper backrest and the headrest are moved into a position that protects the head against possible whiplash. In addition, the optional pneumatic side bolsters are filled with air to secure the driver's torso.

Strong protection: crash safety

The new Audi A8 has a body that offers excellent protection against all types of collisions. The longitudinal members at the front end are made of extruded sections and high-strength castings. In the event of a front-end collision, four load paths on each side of the car absorb the forces. Two of these are located in the upper portions of the fenders, the others in the longitudinal members and the buffers installed in front of the subframe for the engine and the front axle. They process and distribute the forces optimally, and the other car involved in the accident also benefits from the homogeneous design of the A8 front end.

A crossmember manufactured out of a double-box section and bent into the shape of an omega provides additional protection for the passenger cell. The omega bracket, a new development from Audi, is located on a line with the footwells and diverts the forces into the floor and the A-pillars. The longitudinal members in the floor panel come together in the shape of an arrow below the rear bench seat. Together with the centre tunnel they constitute the body's strongest node.

Standing guard in the cabin is the adaptive restraint system, which is networked with Audi pre sense. It draws its own information from eight acceleration and pressure sensors, two each in the control unit, at the front of the car, in the C-pillars and in the doors. It intelligently manages the interplay between the airbags and the belt force limiters to offer outstanding protection to passengers of any size, with smaller persons benefiting in particular.

Sensors on the front seat rails detect how far forward or back the seat is positioned. Because the control unit then knows the approximate position of the passenger, it can ensure that optimal use is made of the distance over which the upper body is slowed by the belt and the airbag. Audi pre sense reduces this distance by roughly 10 centimetres because the belts are tensioned before the crash occurs.

If a passenger is sitting close to an airbag – this is typically a smaller person – a portion of the air is quickly expelled via valves after the airbag inflates so that the head and chest are gathered in more gently by the airbag. In a hard crash or with large occupants who sit farther back, the valves remain closed longer. The variable belt force limiters are also designed to be adaptive. They control belt tension so that the load on the chest remains as low as possible. Bracing structures, energy-absorbing pads and crash-optimised pedals reduces loads on the feet and legs.

Rear-impact protection: the integral head restraint system

The structural design of the seats and headrests is an important element of safety design, especially in the case of a rear-end collision. These types of accidents frequently occur at traffic lights, usually with impact speeds between 15 and 50 km/h. In such collisions, the seatback is accelerated to between 7 and 25 km/h within a tenth of a second. The integral head restraint system from Audi acts here to counter the risk of whiplash injuries.

Four side airbags in the backrests of the front seats and the outside rear seats stand at the ready to catch the pelvic area and chest of the occupants in the event of a side-impact collision. The head airbag system protects the head. Stretching from the A-pillar to the C-pillar, it opens like a curtain from the roof frame to the door sill and is filled extremely quickly by the gas generator.

The new A8 has three-point automatic seatbelts with tension limiters at all five seats. The rear seats are equipped with Isofix fixtures for installing child seats. Large beams in the rear protect the passenger cell; the rear wheels are braced against the side sills in the event of a collision. The spare wheel well, which contains technical components like the battery or the compressor for the air struts, is very robust thanks to its high percentage of fibreglass and the voids in its plastic structure. A wide strip of embedded aluminium makes it even stronger.

The new A8 satisfies all legal requirements for the protection of pedestrians in the event of a crash. A special foam between the front bumper and its crossmember makes the impact slightly easier on the knees. If the head should hit the engine hood, the sheet metal can deform over a wide range. The gap between it and the hard components in the engine compartment is large. The standard insurance category crash – a parking lot crash – has no major financial consequences. The aluminium crash boxes bolted in front of the crossmembers at both the front and at the rear of the car are relatively easy to replace.

The front and rear sensors remain undamaged in the event of a low-speed parking crash because they are cleverly integrated into the deformable covering of the bumpers. The radar sensors for the ACC stop & go function and the camera for the night vision assistant are deep inside their cavities.

Driver assistance systems

The new A8 also demonstrates the innovative power of Audi in its assistance systems, offering a wide range of high-tech systems. These systems regulate the distance to the car ahead, help the driver to change lanes and stay in the lane, and assist with parking. Compared with the competition, the systems in the new A8 are considerably more powerful and intelligent.

The radar-aided automatic proximity control system, adaptive cruise control with stop & go, is a major advancement over its predecessor. It regulates the speed and the distance to the vehicle ahead by accelerating and braking in a speed range from 0 to 250 km/h, and brakes automatically within certain limits.

The system, which Audi has subjected to more than 600,000 kilometres of field testing, is particularly convenient in stop & go traffic. It brings the new A8 to a stop roughly four metres behind the vehicle ahead with no intervention on the part of the driver. If the stop is brief, the sedan automatically resumes moving again; after a longer stop the driver must tap the accelerator or the cruise control lever. The driver can also anticipate and do this while the A8 is still stopped. The car is then ready to depart for the next 15 seconds and follows the vehicle ahead as soon as it begins rolling.

The two radar sensors play a major role in the performance of the system. They are installed in the air inlets at the front of the car and are automatically heated when it is cold. They transmit radar waves at a frequency of 76.5 gigahertz covering a 40 degree wedge-shaped field measuring 250 metres in length. A computer uses this to analyse the traffic situation in front of the vehicle and detect the preceding vehicles.

The driver can influence the function of the ACC stop & go; the interval to the vehicle ahead is adjustable in four steps and the three levels of control system dynamics have been defined. Acceleration and braking is comfortable. Deceleration is limited to 4 m/s^2 – a good third of the maximum and subjectively equivalent to stepping on the brake pedal with medium force. The six-piston pump at the heart of the brake system generates the pressure very smoothly and harmoniously.

Rearward-looking radar: Audi side assist

Audi side assist activates at speeds above 30 km/h. Two 24-gigahertz radar systems in the rear observe what is happening behind the A8 to a distance of 70 metres. Their data is analysed by a computer. If another vehicle moves into the critical zone – if it is riding in the blind spot or approaching rapidly from the rear – the so-called information stage is activated. A yellow LED indicator illuminates in the casing of the driver's side mirror.

If drivers activate their turn signal to change lanes in spite of the warning, the indicator become brighter and flashes at a high frequency. This signal – the warning stage – can hardly be overlooked. The display is such that in practice it is only visible to the driver. Its brightness adapts to ambient light conditions and can also be adjusted via the MMI control terminal.

Keeps you in your lane better: Audi lane assist

Audi lane assist is another assistance system. At speeds above roughly 65 km/h, Audi lane assist warns the driver when he or she is about to leave the lane inadvertently. A camera mounted in front of the rear-view mirror observes the road to a distance of 60 metres and a coverage angle of 40 degrees. It delivers 25 high-definition images per second. Sophisticated software processes the images, identifies the lane markings and the course the A8 is following between them.

If the driver allows the car to wander in the direction of a lane marking but has not indicated that he or she intends to make a turn, Audi lane assist warns the driver by vibrating the steering wheel. The vibration is generated by a vibration motor in one of the spokes; its intensity can be adjusted in three stages using the MMI. When this warning is given is also selectable – before the wheel touches the line, when crossing the line or at the discretion of the system.

Compared to the previous version, Audi lane assist has become much more powerful. For instance, the colour camera can differentiate between the yellow line in construction zones and the white ones. It meets its limits under particularly unfavorable conditions, such as in the snow or if the road surface is very dirty. It informs the driver when this is the case.

The camera of Audi lane assist serves a number of important functions in addition to this primary function. It provides important imagery for the ACC stop & go – it can detect vehicles on the road ahead and recognise when they signal. Its data also go into the startup function in stop & go traffic. The camera's images also play an important role in emergency braking initiated by Audi pre sense front and for the continuous headlight range control.

The third eye: the night vision assistant

Also debuting in the new Audi A8 is the night vision assistant, which is activated via a button at the light switch. The heart of this system is a thermal imaging camera mounted behind the outer left of the four rings at the front of the car. It has a wide, 24-degree angle of view, and its protective window is cleaned when dirty and heated when cold.

As a far infrared system (FIR), the camera reacts to the heat radiated by objects. A computer transforms the information from the camera into black-and-white images and displays them on the central display located between the instruments. The view continuously tracks the road and the course of the A8.

The far infrared technology has significant strengths, particularly when compared to the competing near infrared systems. Independent of driving speed, it can look as far as 300 metres ahead, far beyond the range of the high beams, and therefore is not blinded by headlights and similar light sources. Most importantly, it concentrates on the essentials: animals and people. Regardless of whether they appear bright or dark to the human eye, they are conspicuously bright in the image due the heat they give off, whereas the cooler road appears dark.

The image processing software can detect persons at a range of 100 metres for even greater safety. When analysing the data, it specifically seeks out human contours and objects that are bright and round – their heads, in other words. Traffic lights, tail lights, and similar light sources are subtracted out. Detected persons are highlighted with yellow markings on the display. If the control unit assumes a hazard because a person is walking on the road close to the car, for example, the person is highlighted in red and a warning gong sounds.

Audi made a conscious decision to not use the first-generation night vision devices, which did not have this highlighting function. Studies have shown that they tend to

increase the burden on the driver in critical situations. The system in the new A8, however, relieves the burden on the driver by adjusting its range and warning thresholds to the speed driven, eliminating unnecessary irritations in many situations.

The marking, the gong, and image contrast can be configured via the MMI. Like every assistance system, the night vision assistant also works within certain, very liberal system limitations. Pedestrian highlighting is switched off at temperatures above 28 degrees Celsius, for example.

Help when maneuvering: the parking assist systems

The parking assist systems in the new A8 make maneuvering more comfortable and safe. The parking system uses four ultrasonic sensors up front and in the rear to indicate the distance acoustically and graphically on the MMI display. The front sensors also monitor the starting zone immediately in front of the car for the ACC stop & go when the A8 is creeping along in traffic.

The reversing camera also uses an extremely light-sensitive external camera. Mounted in the trunk lid, its fish-eye lens covers a broad 130 degree field of view. The images generated by this camera are processed to remove distortion and displayed on the MMI operating system monitor. Guidelines and fields show the car's projected path.

All driver assistance systems in the new A8 serve a common objective with their intelligent sensors, lightning-fast calculations, and high degree of integration: to support the driver in his or her work behind the wheel. They never force themselves on the driver, never make decisions for the driver, and never restrict the driver. Instead they make driving easier, more relaxed and smoother. That is because all Audi technology is focused on the person.

Infotainment systems

Audi has also set the bar significantly higher with regard to multimedia technology with the new A8. The new MMI navigation plus system provides its data to other technology modules, making the entire car highly intelligent. Its radically new operating concept with the MMI touch touchpad is another pioneering solution. The

new A8 also leads the competition with respect to telephony and infotainment features.

The new MMI navigation plus is pure high-tech. All functions, including the DVD drive, are integrated in the main unit – the central computer in the centre console. A8 owners can use a third of the 60 GB hard drive as a jukebox holding up to 4,000 songs. The hard drive also stores the navigation data. Two processors ensure that all applications such as navigation, voice control, telephony and audio remain fast and fluid when used simultaneously.

The functions of the tuner and sound system are consolidated in a second block, the radio unit. A central interface connects both units to the vehicle network. All the components have been developed according to strict Audi specifications. The Audi quality standards were as uncompromising as ever because the electronics used in a car have to be able to withstand extreme temperatures and vibrations.

Revolutionary operation: MMI touch

Audi has taken a revolutionary new path in the operation of the MMI navigation plus: it uses a touchpad like on a laptop. The touchpad is standard. To enter the destination or even the phone number, you simply draw the letters or numbers on the touch-sensitive control panel with the index finger of your right hand. The MMI touch can also be used to navigate with the map.

The new input technology functions intuitively and takes no time at all to get used to. Unlike with the touchscreens used by the competition, the right hand is ideally guided because it rests on the selector lever of the eight-speed tiptronic. The finger traces the letters and numbers almost automatically without the driver having to look down to check and see how it's doing. The driver's eyes stay on the road.

The system acknowledges the input after each character with an acoustic feedback signal. If you make a mistake, a simple swipe from right to left is all that it takes to delete the wrong character. In contrast to voice control, touchpad input is possible even while speaking or listening to an audio source.

The MMI touch technology is based on a network that was supplied with millions of character samples from around the world so that it can be used internationally. It also recognises Cyrillic, Chinese, Cantonese, Japanese and Korean characters. An

intelligent additional feature is the Black Panel technology: Here the pad becomes a control panel containing six programmed radio stations.

Along with MMI touch, the new A8 also offers the familiar Audi operation with the MMI rotary pushbutton. The optional voice control understands complete words, not just individual letters. Audi has made it even better: places and roads can now be spoken as commands, and it can even be used to access music data easily.

Sparkling brilliance: the Bang & Olufsen Advanced Sound System

At the top of the line in the sound systems is the Bang & Olufsen Advanced Sound System. It is impressive for its sparkling brilliance, detailed resolution and broad, finely differentiated frequency range; in conjunction with MMI navigation plus it also includes a surround sound function. The Danish sound wizards use a proprietary algorithm to generate reflections like those that occur in a concert hall. The Advanced Sound System puts the music on a magnificent virtual stage, with the passengers of the A8 sitting in the front row.

The heart of the Advanced Sound System is formed by two amplifiers with over 1,400 watts of total output. Like most of the infotainment components in the new A8, they are integrated into the rear seatback.

The amplifiers' extremely efficient digital output stages direct this power through 19 channels to 19 speakers. A visual highlight is achieved by the acoustic lenses on the left and right sides of the cockpit. The two newly designed tweeters are mounted down out of sight and emerge from the dashboard when the system is switched on.

Audi and Bang & Olufsen are partners in pursuit of the same ideals. Both brands value high-end technology, intuitive operation, and premium, technoid design. Both also share an uncompromising attitude with respect to materials and workmanship, and in-depth competence in working with aluminium.

Bang & Olufsen uses the lightweight material for the speaker covers.

Entertainment in the back: rear seat entertainment

Audi has developed the rear seat entertainment system for A8 passengers large and small who frequently ride in the back seat. Two 10.2-inch displays – a record-setting

16 millimetres thin – are integrated in the backrests of the driver and front passenger seats. They can be tilted 10 degrees and they can separately display different content. Sound is supplied via wired or Bluetooth headphones.

The rear seat entertainment system includes a separate single DVD drive, a hard drive jukebox, two slots for SD memory cards, and its own Audi music interface. The system also has full access to the radio, the TV tuner – whose picture can also be seen in the back while underway – the DVD changer, the telephone and the navigation system. A separate large MMI controller in the rear centre armrest controls the system – another instance of first-class convenience.

Deluxe communication: telephone services

Audi offers a Bluetooth hands-free system and the Bluetooth car phone for stress-free phone calls. Drivers can leave their mobile phone in their jacket pocket; the car phone borrows the data from the SIM card and phone storage via Bluetooth. It uses the vehicle antenna for optimal reception and a digital voice processor ensures excellent hands-free speech quality. The sound system transmits voice signals; the radio volume control regulates the sound level.

Equipment and trim

The A8 is Audi's new technological spearhead – and its equipment underscores this standing. A broad range of high-end features are already standard on this luxury sedan.

In the case of the engines, there is the recuperation system for all engines, the innovative thermal management and the start-stop system on the 3.0 TDI. In terms of power transmission, the brand's new flagship shines with the electronically controlled eight-speed tiptronic that can be shifted using the paddles on the steering wheel, as well as the dynamically tuned quattro permanent all-wheel drive and the sport differential (standard).

In terms of running gear, the A8 secures an special standing with Audi drive select; the system integrates the adaptive air suspension together with active shock absorber control. The xenon plus headlights, the distinctive LED tail lights, the advanced ESP, the Audi pre sense basic system and the anti-theft alarm system serve safety. The adaptive restraint system, the tyre pressure monitoring system,

and the windshield made of composite safety glass reinforce the sense of safety on board the new A8.

When it comes to convenience, the new A8 impresses with solutions such as the power fold-in exterior mirrors, the versatile power-adjustable front seats, the four-zone automatic climate control system, the power-adjustable steering column, the ambient lighting, the electro-mechanical parking brake and the start-stop button.

Ergonomics is a traditional Audi strength, and the new A8 reinforces this with sophisticated standard solutions. These include the MMI operating system with its eight-inch monitor and the driver information system, which has its own display and is controlled via the multifunction steering wheel.

Top of the class: optional extras

Please see separate specifications brochure on your press kit for all options.

The ultimate in luxury: the seating options

You can't drive well if you don't sit well, which is why Audi offers a particularly wide range of options in this area. The comfort seats for the driver and front-seat passenger can be adjusted 22 ways, with options for heating, ventilation, a five-program massage function and a variant with sporty upholstery. Options for the rear seat include power adjustment for the two separate outside seats, combined with heating, ventilation and massage.

The new A8 also leads the way in navigation and infotainment systems. The top version, standard in Australia the MMI navigation plus, has the data on the road ahead and forwards these to the control units for the transmission, the headlights and the ACC stop & go function. The navigation system is operated using MMI touch – a solution with which Audi once again sets new standards.

Many drivers of luxury sedans are dedicated individualists, and Audi has developed a wide range of interior colours, upholstery and inlays just for them. The two Audi design selection variants impress with particularly exclusive combinations and a variety of optional packages with leather, Alcantara and decorative applications.

- ends -