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The fastest production Audi ever: the new Audi R8

The equipment and data specified in this document refer to the model range offered in Germany. Subject to change without notice; errors and omissions excepted.

*The fuel consumption and CO_2 emissions of all models named above and available on the German market can be found in the list in the last chapter of this basic information.

Compact version

Power, Speed, Performance – the new high-performance Audi R8 sports car

From 0 to 100 km/h *(62.1 mph)* in 3.2 seconds, from 0 to 200 km/h *(124.3 mph)*, 9.9 seconds and a top speed of 330 km/h *(205.1 mph)*. Naturally-aspirated V10 mid-engine with up to 449 kW (610 hp) of power responds instantly to throttle inputs. Aerodynamic concept of a race car: The new Audi R8* is the dynamic vanguard of Audi – no other car with the four rings is so close to car racing.

“Car racing has been a part of our Audi DNA for many decades,” says Prof. Dr. Ulrich Hackenberg, Board Member for Technical Development. “Audi stands for automotive dynamism, and this applies very much to our new high-performance R8 sports car. In all technical areas it is extremely close to being a race car. It is the most powerful, fastest and sharpest production Audi ever.”

The new R8 launches on the market this fall in two engine versions – as the R8 V10 plus with 449 kW (610 hp) it is the most powerful and fastest production Audi ever built. The 5.2-liter V10 enables breathtaking performance, and its hissing, roaring sound is highly emotional. Yet fuel economy has been improved by up to 13 percent in the R8 model series compared to the previous model.

Fully variable torque distribution: the new quattro drive

In the powertrain, the lightning-quick shifts of the seven-speed S tronic dual-clutch transmission, an optimized mechanical differential lock and a new electro-hydraulically activated multi-plate clutch work together. The actively cooled all-wheel drive system can distribute torque freely between the axles. The intelligent dynamic control system for the quattro drive is incorporated into the Audi drive select dynamic handling system that offers four basic modes.

In each mode, the new high-performance sports car expresses a different character – from relaxed freeway cruiser to race car on the circuit track. In the top R8 V10 plus model, a performance leather steering wheel is standard equipment.

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In its performance mode, it offers three additional modes: dry, wet and snow. They make handling even more precise and sharper, tuned to the friction coefficient of the specific road surface. The new technology is also available on the R8 V10, including the steering wheel that is used to select the special modes.

Dry weight: 1,454 kg *(3,205.5 lb)*

The new Audi R8 V10 plus has a dry weight of just 1,454 kg *(3205.5 lb)*. This was primarily due to its newly conceptualized Audi Space Frame (ASF) in multimaterial construction – which consists of aluminum and CFRP parts. The ASF weighs just 200 kg *(440.9 lb)*. The entire underbody has a smooth covering, like on a race car, and the air flow exits via a large diffuser. This increases downforce. At top speed, this amounts to 40 kg *(88.2 lb)* at the front axle and 100 kg *(220.5 lb)* at the rear axle. The large CFRP rear wing also plays an important role in attaining these top figures.

Exclusively for the driver: operating controls

Just like in a race car, the interior of the high-performance sports car focuses on the driver. The driver can read off all key information at a glance from the Audi virtual cockpit. The steering wheel, instrument cluster and road all line up along one central visual axis. Drivers can operate all important functions with the multifunction and satellite push-buttons without having to take their hands off the steering wheel or look away from the road.

The Audi virtual cockpit is user configurable, and it shows all displays in elaborate 3D graphics – if desired, with one large rev counter and auxiliary gages that show much more information, such as tire temperature and torque output. MMI navigation plus with MMI touch is standard equipment in the new R8. This high-end media center was designed to follow a simple operating logic.

Extreme lighting range: laser spot for the high beam headlight

The workmanship of the new R8 – which is handcrafted at a new plant near Neckarsulm – is superlative. Its range of optional technology components extends to the sound system from Bang & Olufsen and the Audi laser spot, which doubles the range of the high-beam light.

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Sister models: Audi R8 LMS and Audi R8 e-tron

No other production car with the four rings shows as much affinity for the race track as the new R8. This is also proven by its sister models – the new GT3 race car, the Audi R8 LMS, and the purely electric high-performance sports car, the Audi R8 e-tron. For the first time, Audi developed all three versions simultaneously, in order to optimally exploit synergies. Both the new Audi R8 and its motorsport variant, the R8 LMS, have made significant performance gains, thanks to the close cooperation between race car engineers, motorsport specialists and developers. Just ten weeks after its world premiere at the Geneva Motor Show, the R8 LMS made its dazzling entrance on the 24-hour racing scene, seizing overall victory on the Nürburgring.

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Summary

Taking dynamism to the limit – the new Audi R8

No other production car with the four rings is as powerful, fast or distinctive: The new high-performance R8 sports car is designed for maximum dynamism in all of its technical aspects – from its Audi Space Frame (ASF) to its aerodynamics and newly developed quattro all-wheel drive. The naturally-aspirated V10 mid-engine guarantees tremendous performance, especially in the top version with 449 kW (610 hp): The sprint from 0 to 100 km/h (*62.1 mph*) takes just 3.2 seconds, and its acceleration tops out at a governed maximum speed of 330 km/h *(205.1 mph)*.

A powerful, high-revving mid-engine, a quattro drive system with freely variable torque distribution, systematic lightweight design with an ASF made of CFRP and aluminum and a dynamic chassis all make the R8* the sporty vanguard of Audi, and it is sharper than ever. The close cooperation between race car engineers, motorsport specialists and developers has led to significant performance gains – in both the road-version sports car and the R8 LMS race car that was designed simultaneously.

“The new Audi R8 V10 plus is the most powerful and fastest production Audi ever,” says Prof. Dr. Ulrich Hackenberg, Board Member for Technical Development. “Motorsport has always been a solid component of our brand character. With the new R8 series, our engineers are transferring their entire accumulated racing expertise from the race track to the road. It also lets us reinforce our core brand values of dynamism, design and quality.”

Engine: V10 in two versions

The engine of the new Audi high-performance sports car is available in two versions – with 397 kW (540 hp) for the R8 V10 and 449 kW (610 hp) for the R8 V10 plus. Their maximum engine torque – 540 Nm *(398.3 lb-ft)* and 560 Nm *(413.0 lb-ft)*, respectively – is available at 6,500 rpm for both engines. Compared to the previous model, power has increased considerably, and the responsiveness of the high-revving (up to 8,700 rpm), naturally aspirated 5.2-liter engine is now even more spontaneous. Like a race car engine, the V10 engine has dry sump lubrication. Its characteristic sound is now even fuller, and Audi can install a sport exhaust system as an option.

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Fuel economy is better than in the previous model – by up to 13 percent (33 g/km *(53.1 g/mi)* CO_2). The new V10 engine was given effective efficiency technologies. They include the COD (cylinder on demand) system, which shuts off one row of cylinders under low load conditions. Another is dual injection, which injects the fuel into the combustion chambers and induction manifold according to demand. When the driver takes their foot off the accelerator pedal at speeds over 55 km/h *(34.2 mph)*, the new R8 goes into a coasting mode. When the car comes to a stop, a start-stop system deactivates the V10 engine.

In the sports car world, the new Audi R8 is right among the leaders in terms of its driving performance. The V10 accelerates from 0 to 100 km/h *(62.1 mph)* in just 3.5 seconds, and it accelerates to a top speed of 320 km/h *(198.8 mph)*. For the V10 plus, the fastest production Audi ever, the figures are 3.2 seconds and 330 km/h *(205.1 mph)*, and it takes just 9.9 seconds to sprint from 0 to 200 km/h *(124.3 mph)*. In the top model, each horsepower only has to move 2.38 kg *(5.2 lb)* of dry vehicle weight – an excellent power-to-weight ratio.

Stability and dynamics: the new quattro drive

Positioned behind the V10 is a seven-speed S tronic that executes lightning-fast gear shifts by electrical control (shift-by-wire). The dual-clutch transmission directs forces to a newly designed quattro drive system with an electro-hydraulically activated multi-plate clutch at the front axle. It has active water cooling for maximum performance. The clutch distributes drive torque fully variably according to the driving situation – up to 100 percent can be directed to either the front or rear wheels.

Management of the clutch is integrated in the Audi drive select dynamic driving system, and it gives the driver a choice between the basic modes comfort, auto, dynamic and individual. On the R8 V10 plus (and as an option for the V10), the performance mode comes with three additional modes: dry, wet and snow. They adapt key handling parameters to the friction coefficient of the road surface. A mechanical rear differential lock is standard; its locking values were newly tuned to work together with the actively controlled quattro drive.

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Motorsport DNA: chassis has double wishbones

The motorsport DNA of the new Audi R8 also expresses itself in the chassis area with its aluminum double wishbone suspensions. On the V10 plus, the tuning is very sporty, and electronically controlled shock absorbers (Audi magnetic ride) are available as an option in both engine versions. The new electromechanical power steering system gives drivers finely differentiated road feedback. As an alternative, Audi can install dynamic steering, which adapts its steering gear ratio to the vehicle's driving speed.

In both engine versions, the new Audi R8 has standard 19-inch wheels, and 20-inch wheels with size 245/30 tires in front and 305/30 at the rear are available as an option. The powerful brakes decelerate the car effectively; in the top model, the disks are made of carbon-fiber ceramic (optional on the R8 V10).

Besides integrating the quattro drive system, the Audi drive select system also integrates other systems into its four basic modes: the accelerator pedal, steering, S tronic, damper control (optional), dynamic steering (optional) and the flaps of the exhaust system. In the dry, wet and snow performance modes, the Electronic Stabilization Control (ESC) system is also managed.

Lightweight design: dry weight is only 1,454 kg *(3,205.5 lb)*

In the top model, the R8 V10 plus, the unladen weight (without driver) is only 1,555 kg *(3,428.2 lb)*, and the dry weight is a low 1,454 kg *(3,205.5 lb)*. Playing a decisive role in this systematic lightweight design concept is the Audi Space Frame (ASF), which weighs just 200 kg *(440.9 lb)* thanks to a new type of multimaterial construction. It comprises 79 percent aluminum and 13 percent carbon-fiber-reinforced polymer (CFRP) and was designed according to the Audi motto "The right material in the right amount at the right place."

The aluminum parts create a framework that integrates large CFRP components – the center tunnel, rear wall and B-pillars. On the R8 V10 plus, add-on parts such as the sideblades and diffuser are made of CRFP, which complements the lightweight alloy exterior skin. Compared to the previous model, the multimaterial ASF has 40 percent greater torsional rigidity, and its acoustics and crashworthiness also get top grades.

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As in a race car, the aerodynamic concept of the new Audi R8 is designed primarily for driving stability. Its central element is a long and wide diffuser in the underbody. On the R8 V10 plus, a total of 140 kg *(308.6 lb)* of downforce is generated at top speed: 40 kg *(88.2 lb)* at the front axle and 100 kg *(220.5 lb)* at the rear axle.

Design: low, wide and extended

The new Audi R8 is 4.42 meters *(14.5 ft)* long and 1.94 meters *(6.4 ft)* wide. Its proportions – with its cabin placed far forward, a long back and relatively short wheelbase – make the technology concept of the mid-engine sports car clearly recognizable at first glance. Characteristic design features of the previous model now take on a sharpened expression. The sideblades, for instance, are now interrupted by the continuous shoulder line that gives the sides a look of tension and excitement.

Large air inlets with vertical fins and LED headlights flank the wide, low-profile Singleframe grille that has a strong sculpted appearance. As an option, Audi can deliver LED headlights with laser spots that double the range of the high-beam headlights This option also includes dynamic turn signals in front; they are standard in the LED tail lights. The look at the rear is shaped by the diffuser, the ventilation screen of the engine compartment and – on the V10 plus – a CFRP fixed wing.

The eleven exterior colors that are offered may be combined with any of the six versions of sideblades. The R8 V10 plus adds CFRP sideblades with a gloss finish as standard equipment (optional for the R8 V10). The Audi exclusive program lets customers order any paint colors blended according to their wishes. Buyers can also choose any color for the sideblades.

Interior: aesthetic lightweight design

In the interior too, the lightweight design concept of the new Audi R8 is expressed in taut lines. The defining element is the arch-shaped “monoposto” that wraps around the cockpit. The instrument panel appears to float weightlessly, and turbine-shaped controls for the automatic air conditioner are arranged along its lower edge. Behind the seats is a cargo space with 226 liters *(8.0 cu ft)* of capacity. It supplements the 112 liter *(4.0 cu ft)* luggage compartment at the front of the car.

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The low-mounted sport seats with integrated head restraints are entirely new. In the plus model, there are lightweight bucket seats (optional on the V10). Customers can choose between Alcantara and fine Nappa leather for the upholstery in a number of different color combinations. In addition, two leather packages are offered as well as a new diamond quilted pattern and decorative trims in matt CFRP. Individualists can have nearly any other special wishes fulfilled in the Audi exclusive program.

Like in a race car: controls & displays

At the controls of the new Audi R8, the driver feels like a race car driver. All important functions can be controlled without drivers taking their hands off the steering wheel or looking away from the road. The R8 sport leather steering wheel with multifunction plus, which is standard on the R8 V10, integrates two satellite buttons for starting and stopping the engine and for Audi drive select. The R8 performance leather steering wheel with four control satellites (standard on the V10 plus, optional on the V10) offers one additional push-button with a turn wheel for the performance mode and another for controlling the exhaust system.

The digital display is also reminiscent of a race car: The Audi virtual cockpit, a TFT monitor with a 12.3-inch screen, presents all information in intricately rendered, high-resolution graphics. The driver can choose between three views. In the performance view, the rev counter is centrally located, and other indicators and gages are arranged around it – such as for torque, power, oil temperature, tire temperature, g-forces and lap times on the race track. Drivers can individually configure the gages around the speedometer and rev counter according to their needs and uses.

Includes MMI navigation plus: equipment

The new R8 comes with a generous set of standard equipment. One highlight is MMI navigation plus with MMI touch. Like in a smartphone, the operating logic is structured in flat hierarchies, including a free text search function. Vehicle functions can be controlled from the steering wheel, the MMI terminal on the console of the center tunnel or by voice control. Audi connect is the perfect component to complement MMI navigation plus. It brings the new R8 online via the high-performance LTE standard. The second generation modular infotainment platform (MIB) makes this possible. The sound system from Bang & Olufsen and the Audi phone box round out the infotainment line-up.

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Market launch: autumn 2015

The Audi R8 success story began with the market launch of the first generation in 2007. Since then, the company has sold just under 27,000 units of the model. Advance sales of the new Audi R8 began on May 13, 2015. The entry-level price for the Audi R8 V10 is 165,000 euros, and the top version, the Audi R8 V10 plus, sells for 187,400 euros. First deliveries will take place this autumn.

New craftscale production facility: Audi Böllinger Höfe

The new Audi R8 is being built in a specially constructed production facility known as the “Audi Böllinger Höfe” in Heilbronn. Body manufacturing and final assembly both feature many new methods and are organized highly flexibly – especially for limited volume series with a handcrafted character. They offer a lot of freedom that enables fulfillment of individual customer requests.

As many as 500 highly qualified specialists are employed in the new R8 manufacturing facility, which is operated by quattro GmbH. They build each car with the greatest handcrafting precision in 15 cycles, each around 30 minutes long. Before delivery, each new high-performance sports car must successfully complete a stringent quality acceptance process.

920 Nm *(678.6 lb-ft)* of torque: the Audi R8 e-tron

The purely electric Audi R8 e-tron has been further developed comprehensively. The multimaterial ASF of the new production R8 has been extended by a rear body module made of CFRP. The car’s c_D value is a low 0.28, and its exterior skin is made of CFRP and aluminum. The front end and sideblades have e-tron specific lighting solutions.

The T-shaped high-voltage battery is ideally positioned for a low center of gravity, and it is integrated into the ASF in the center tunnel behind the occupant cell. The high-voltage battery is based on a new type of lithium-ion technology. Compared to the first R8 e-tron technology demonstrator, battery capacity has grown from around 40 kWh to 90.3 kWh. This gives the R8 e-tron a driving range of up to 450 km *(279.6 mi)* on one battery charge. Its Combined Charging System (CCS) is also designed for quick charging with DC electricity. Its thermal management system with a heat pump intelligently utilizes waste heat and simultaneously ensures efficient temperature control of the interior.

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The two electric motors on the rear axle each output 170 kW of power and 460 Nm *(339.3 lb-ft)* of torque. Torque vectoring distributes the torque between the wheels for maximum stability and dynamism. The Audi R8 e-tron accelerates from 0 to 100 km/h *(62.1 mph)* in 3.9 seconds, and its top speed is electronically governed to 250 km/h *(155.3 mph)*. A new intelligent energy management system makes the new car significantly more efficient than the first generation R8 e-tron. An electromechanical brake system at the rear axle enables high recuperation rates when braking.

For the racetrack: the Audi R8 LMS

Making its debut at the same time as the R8 road-version sports car is the new R8 LMS race car. It shows just how closely motorsport and production cars are interrelated at Audi. The share of identical parts between the two cars is around 50 percent, and the bodies of both cars are produced at “Audi Böllinger Höfe”.

The chassis of the rear-wheel drive GT3 race car is based on a multimaterial ASF, which is point-reinforced, plus a safety cage. Large areas of its exterior skin are made of CFRP. The race car’s homologation weight is 1,225 kg *(2,700.7 lb)*. The V10 is practically identical to the production engine, and it outputs around 430 kW (approx. 585 hp). The car’s aerodynamics have also been further developed, and its c_D figure has been lowered. Special diffusers in the rear body and smooth underbody panels create more downforce in the new R8 LMS. This makes it possible to implement a smaller spoiler, which increases the car’s top speed.

Sales of the new Audi R8 LMS to customer teams worldwide will begin with the 2016 season. In 2015, the new race car is already competing in its first races with factory teams in international endurance races such as the 24-hour race at the Nürburgring and in Spa. Just ten weeks after its world premiere at the Geneva Motor Show, the R8 LMS made its dazzling entrance on the 24-hour racing scene, seizing overall victory on the Nürburgring.

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The new Audi R8

Engine

- Naturally aspirated high-revving V10 with dry sump lubrication
- 5.2-liter displacement, two versions: 397 kW (540 hp) and 449 kW (610 hp), 540 Nm *(398.3 lb-ft)* or 560 Nm *(413.0 lb-ft)* of torque at 6,500 rpm
- High-revving, spontaneous engine response, characteristic sound
- Cylinder on demand (COD), coasting mode, start-stop system, dual fuel injection, fuel consumption up to 13 percent lower than in previous model.
- Excellent driving performance: 0 – 100 km/h *(62.1 mph)* in 3.2 seconds, 0 – 200 km/h *(124.3 mph)* in 9.9 seconds, top speed of 330 km/h *(205.1 mph)* (on the R8 V10 plus)

Drivetrain

- Lightning-fast shifts with seven-speed S tronic, shift-by-wire signal transmission
- Newly developed quattro permanent all-wheel drive with electrohydraulically activated multi-plate clutch, fully variable distribution of drive torque, rear differential lock.

Chassis

- Double wishbone suspensions, front and rear, optional Audi magnetic ride damper control
- High-performance brakes at all four wheels, optional ceramic brake disks
- Newly developed electromechanical steering, dynamic steering system as an alternative
- Standard 19-inch wheels with mixed tires, optional 20-inch wheels
- Audi drive select dynamic handling system with four standard modes; optional three additional performance modes for maximum dynamic performance (standard in V10 plus)

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Exterior design and Audi Space Frame (ASF)

- Characteristically taut mid-engine sports car design
- Two-part sideblades, standard LED headlights, optional laser spot for high-beam, dynamic turn signals
- New Audi Space Frame in multimaterial construction made of aluminum and CFRP; ASF weighs 200 kg *(440.9 lb)*, vehicle dry weight 1,454 kg *(3,205.5 lb)* (R8 V10 plus)
- Top figures for torsional rigidity, crash safety and acoustics
- Aerodynamic concept focuses on high downforce figures

Interior

- Clean lines, monoposto arch in cockpit, hovering instrument panel
- Newly conceptualized sport seats, R8 V10 plus with lightweight bucket seats
- New colors and materials, many customization options

Controls & displays

- Controls are fully focused on the driver; all key functions are on the steering wheel
- Two steering wheel versions with two or four satellite buttons
- User-configurable Audi virtual cockpit that offers a 12.3-inch screen with brilliant, high-resolution displays is standard. Performance view shows additional information such as torque, power, oil and tire temperatures, g-forces and lap times on the race track

Infotainment and Audi connect

- MMI navigation plus with MMI touch is standard, newly developed operating concept with flat hierarchies like on a smartphone, including free text search
- Technology is based on second generation modular infotainment platform (MIB)
- Audi connect, Audi phone box and sound system from Bang & Olufsen are optional

Production

- Crafted at Audi Böllinger Höfe at the Audi production site in Neckarsulm
- Flexible and innovative production, high share of highly skilled handcrafted work

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Audi R8 e-tron

- Purely electric high-performance sports car, two electric motors with combined power of 340 kW and combined torque of 920 Nm *(678.6 lb-ft)*
- 0 to 100 km/h *(62.1 mph)* in 3.9 seconds; top speed of 250 km/h *(155.3 mph)* (electronically governed)
- New battery technology with high power density and energy density
- Maximum driving range extended to max. 450 km *(279.6 mi)*.

Audi R8 LMS

- GT3 race car for global customer racing program; first races already in 2015
- Around 50 percent of its parts are identical to those of production sports car, including the engine
- Reinforced ASF with safety cage, exterior skin made of CFRP

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Full version

The new Audi R8: Audi has further sharpened its sporty vanguard vehicle

The previous model was already the sporty vanguard of the brand – and this applies to the second generation Audi R8* even more. The newly conceptualized high-performance sports car has been made even tauter and stronger, both on and off the race track. Embodied in its DNA is know-how acquired in the numerous car racing successes that Audi has achieved over the years – primarily in endurance racing events. The sport prototypes have won the 24 hours of Le Mans 13 times since 2000, and the R8 LMS contributed seven more overall victories in 24-hour races since 2009.

Its character

“The new R8 V10 plus* is the most powerful and fastest production Audi ever,” says Prof. Dr. Ulrich Hackenberg, Audi Board Member for Technical Development. “With the new Audi R8, our engineers are transferring their bundled racing expertise from the race track to the road. No other Audi evokes such dynamic passion, and none is so closely related to a race car.”

The mid-mounted engine in the Audi R8 is not only a classic concept in motorsport; it is also an integral part of the brand’s sporty DNA. It was already used in the Grand Prix race cars brought to the starting grid by Auto Union in the 1930s, with the powerful engines located forward of the rear axle – which was a revolutionary step at the time. In the year 2000, Audi won the 24 hours of Le Mans for the first time with the LMP R8 prototype. By 2005, the car which provided the name for today’s high-performance production sports car had taken five overall victories at the Sarthe. It was then retired and replaced by the Audi R10 with a TDI engine.

The R8 also enjoyed much success in customer racing – car racing had been a key aspect of its model development from the start. In 2009, the R8 LMS embarked on its career, and by 2014 it had raced to 26 GT3 championships worldwide, 23 other titles and seven overall victories in 24-hour endurance races. Its technology was, and today – in its second generation – it still is closely related to that of the road-version sports car.

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In the second generation, the road-version sports car and the motorsport version, the R8 LMS, were developed simultaneously for the first time and were presented together at the 2015 Geneva Motor Show. Close cooperation between race car engineers, motorsport specialists and developers has given the new Audi R8 a significant boost in performance.

Engine

Offering immense power and extremely good engine response – the further developed
5.2 FSI in the new R8* is a high-powered engine that was systematically designed for high engine speeds. As soon as the engine is started, it revs at 2,500 rpm for fractions of a second. Under load, the naturally-aspirated ten-cylinder engine develops a very unique sound – a throaty hissing and roaring.

Audi offers the V10 with 5,204 cc of displacement in two versions. On the R8 V10, the long-stroke engine (bore x stroke: 84.5 x 92.8 mm *(3.3 x 3.7 in)*) has a power output of 397 kW (540 hp) at 8,250 rpm, and its maximum torque of 540 Nm *(398.3 lb-ft)* is available at 6,500 rpm. For the R8 V10 plus, these values are 440 kW (610 hp) and 560 Nm *(413.0 lb-ft)* at the same engine speeds. At both power levels, the 5.2 FSI can rev up to 8,700 rpm – at limited speed, the pistons travel a total of 26.9 meters *(88.3 ft)* per second.

In the new Audi R8 V10 plus, the engine's specific power is 117.2 hp per liter displacement. Each horsepower only needs to move 2.38 kg *(5.2 lb)* of weight, because the high-performance sports car only weighs 1,454 kg *(3,205.5 lb)* (dry weight). This leads to impressive performance figures: The fastest production Audi ever catapults from 0 to 100 km/h *(62.1 mph)* in 3.2 seconds and from 0 to 200 km/h *(124.3 mph)* in 9.9 seconds. It can continue accelerating to a maximum speed of 330 km/h *(205.1 mph)*. The new Audi R8 V10 accelerates from 0 to 100 km/h *(62.1 mph)* in 3.5 seconds and has a top speed of 320 km/h *(198.8 mph)*.

Compact powerplant: the V10

The V10, which is produced at the engine plant in Győr, Hungary, in part by manual assembly, is very compact. Its low mounting position in the car results in a low center of gravity. The offset between cylinder banks is 18.5 mm *(0.7 in)*. The cylinder firing sequence is 1 – 6 – 5 – 10 – 2 – 7 – 3 – 8 – 4 – 9.

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The crankshaft is designed as a common pin shaft. The connecting rods of opposing pistons are joined to a common crank pin, which results in alternating firing intervals of 54 and 90 degrees. This rhythm makes a big contribution toward producing a very unique, motorsport-like sound. Two flaps in the exhaust system let the driver choose between a comfort-oriented sound and a sporty sound. The entire sound stage is authentic – including the babbling sound when the foot is taken off the accelerator pedal and a more roaring sound when shifting gears under full load.

The cylinder crankcase of the 5.2 FSI is manufactured in a complex low-pressure die-casting process with a high-tech aluminum alloy that combines low weight and high strength. The cylinder liners are honed from the solid piece by exposing the hard silicon crystals. The bed plate construction of the crankcase gives it maximum rigidity, and gray cast iron bearing brackets reduce heat expansion and thereby improve bearing play. The forged crankshaft and the connecting rods that are made of forged steel combine high strength and low weight, and the pistons are forged from an aluminum alloy.

Reliable under all conditions: dry sump lubrication

The motor oil, which is temperature-controlled in a dedicated cooler, comes from a dry sump – a principle borrowed from car racing. This makes it possible to mount the engine extremely low. The pump module, which operates with multiple suction stages, assures proper lubrication under all conditions – including during lateral accelerations of around 1.5 g, which are possible in the new R8.

The camshafts are chain driven, and they operate on the rear side of the engine. All four camshafts can be adjusted by up to 42 degrees crank angle. This enables a broad range of valve timing for the 40 valves that are actuated by roller cam followers. The exhaust valves are sodium filled for better cooling.

Compared to the previous engine, Audi has configured the V10 for even more spontaneous high power output. The compression ratio grew from 12.5:1 to 12.7:1, valve timing was configured for good chamber filling at high engine speeds, and the intake channels were optimized in the lightweight variable intake manifold. The machined inlet ducts and the valve shaft diameter of just 4.8 mm *(0.2 in)* also contribute to optimal flow into the cylinder.

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These extraordinary efforts have led to convincing results: The 5.2 FSI revs just as spontaneously, and even reaches high revs a bit quicker than the best short-stroke engines on the global market. One indicator of this is the jump to full-load, which describes the engine's spontaneous throttle response. This means that as soon as the driver presses the accelerator pedal fully while idling in the stationary car, full load is already available after 6.6 tenths of a second – this is nearly 20 percent faster than in the previous engine. This means that the driver can apply measured acceleration ideally during a sporty style of driving – whether on the race track, during a controlled drift or on snow.

New combustion process: FSI plus MPI

Dethrottling of the air induction system goes hand in hand with a new combustion process. Along with direct injection into the combustion chambers (FSI), the V10 adds fuel injection into the induction manifold (MPI). Two newly developed control units operating by the master-slave concept are at work: each handles part of the large amount of computing work, and together they control the dual injection process.

In the lower part-load range, only MPI injection is used. The high vacuum pressure in the induction manifold vaporizes the fuel very well, which leads to clean combustion. In the moderate load range, induction manifold and direct injection are used in equal measures. In the full-load range, the FSI system, which builds up a pressure as high as 200 bar, performs around 85 percent of the injection. The directly injected fuel swirls intensively, cooling the walls of the combustion chambers, which reduces the tendency to knock. The remaining MPI share contributes to a high charge concentration and to a boost in power.

High efficiency gain: CO_2 is 33 g/m *(53.1 g/mi)* lower

Despite its highly dynamic character, the new Audi R8 consumes far less fuel than the previous model. Its V10 version had a combined NEDC fuel consumption of 13.1 liters per 100 km *(18.0 US mpg)* (equates to 305 g/km *(490.8 g/mi)* CO_2) – while it is now just 11.4 liters per 100 km *(20.6 US mpg)* (272 g/km *(437.7 g/mi)* CO_2), which represents a 13 percent reduction. In the case of the V10 plus, fuel consumption was reduced from 12.9 liters/100 km *(18.2 US mpg)* (299 g/km *(481.2 g/mi)* CO_2) to 12.3 liters per 100 km *(19.1 US mpg)* (287 g/km *(461.9 g/mi)* CO_2).

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The new cylinder-on-demand (COD) technology makes a substantial contribution toward this efficiency gain. Under low to intermediate load conditions – when one of the four upper gears is engaged – it shuts down the cylinders of the left or right bank by deactivating their injection and ignition processes.

If the deactivation phase lasts longer than 30 to 60 seconds, the COD system reactivates the bank to prevent cooling of the catalytic converter, and it deactivates the other cylinder bank. During a long COD phase, it continually alternates back and forth between the two banks. The driver does not perceive this at all. The control unit smooths the transitions, each of which takes around three-tenths of a second, by shutting off the cylinders of each bank sequentially.

Along with the COD system, the 5.2 FSI in the new Audi R8 has other efficiency technologies on-board as well. When the comfort mode of the Audi drive select dynamic driving system is active, and the vehicle speed is under 55 km/h *(34.2 mph)*, the seven-speed S tronic switches over to freewheeling operation when the driver releases the accelerator pedal. It disengages both clutches, and the high-performance sports car coasts. Just before stopping, the start-stop system shuts the engine off entirely; the subsequent engine restart is performed gently.

Seven-speed S tronic

The drivetrain is a special highlight of the new R8* technical concept; it features a seven-speed S tronic that executes gear shifts within hundredths of a second and an intelligent quattro drive system that provides maximum stability and dynamism on any road surface. Audi is presenting the latest state of it technology here.

The seven-speed S tronic is standard with both engine versions – the V10 and the V10 plus. Operating commands are all transmitted electrically (shift-by-wire). The driver can manually shift gears using the gear selector lever or the shift paddles on the steering wheel. Or the driver can have the S tronic shift automatically in the D or S program. At the push of a button, the driver can start off with launch control which engages the clutch at around 4,500 rpm – it applies the power of the V10 to the road with perfectly controlled tire slip.

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Based on its three-shaft layout with one dual drive shaft and two output shafts, the seven-speed S tronic mounted behind the engine is very compact. Its thermal management, which coordinates with the engine, uses an oil-water heat exchanger that is mounted to the transmission. The mechatronics, which are set up as a separate block, activates and lubricates the high-tech transmission. One oil pump suffices to supply oil to the gear wheel sets, clutches and integrated differential lock.

Two multi-plate clutches, one behind the other, operate two independent transmission sub-units. Clutch K1 transfers the torque via a solid shaft to the fixed gear wheels for gears 1, 3, 5 and 7, which are located in the rear section of the transmission housing. A hollow shaft rotates around the solid shaft. It is connected to a second K2 clutch and acts on the gear wheels for gears 2, 4, 6, and reverse. Mounted on output shaft 1 are the gear wheels for gears R, 4, 5 and 1, while the gear wheels for gears 2, 6, 3 and 7 are mounted to output shaft 2.

Both transmission sub-units are continually active, but only one is connected to the engine at any one time. The shifting process runs so smoothly and comfortably that the driver hardly notices it. Gear shifts take just a few hundredths of a second, and they are executed with nearly no interruption of propulsive power.

On output shaft 2, the seven-speed S tronic has a connection to the propeller shaft that runs through the bed plate of the dry sump oil pan to the front axle. An electrohydraulically activated and electronically controlled multi-plate clutch is mounted there, forming a block with the front differential.

quattro drive

The quattro drive system of the R8* has been fully re-developed. The combination of its high-performance mechanical system and software precisely tuned to the mid-engine concept makes it possible to realize dynamic handling properties in a new dimension. The intelligent all-wheel drive software continually distributes torque ideally according to the driving situation, driver inputs and ambient conditions.

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The electrohydraulic multi-plate clutch integrated in the front differential transmits the calculated torque to the front wheels within just a few milliseconds. Unlike the previous component, the new clutch can distribute torque between the axles fully variably – it does not have any fixed underlying distribution. The level of maximum torque transfer was increased significantly for the best possible traction and dynamic handling.

The quattro drive is connected to the engine's coolant circulation system, which utilizes three large radiators at the front of the car. This solution ensures that the clutch can perform its control work fully and precisely under all conditions. A temperature sensor and a pressure sensor continually monitor conditions and adapt control parameters as necessary. Although the multi-plate clutch operates with minimal slip – which is necessary for defined transmission of torque – it surpasses the previous viscous coupling when it comes to efficiency.

The quattro drive is integrated in the Audi drive select dynamic handling system, which lets the driver choose between the basic modes comfort, auto, dynamic and individual. On the R8 V10 plus (and as an option on the V10), there are supplemental programs in performance mode: dry, wet and snow. They adapt dynamic handling parameters to the friction coefficient of the specific road surface.

The purely mechanical rear differential further improves traction and dynamic handling – it exhibits a 25 percent locking effect in traction and 45 percent in thrust. It is precisely designed for the dynamic character of the new R8 and the actively controlled quattro drive system. This results in turn-in behavior that practically eliminates understeer. The mid-engine is positioned very near the vertical axis of the car's center of gravity, so the inertia of its mass hardly comes into play in fast changes of direction. The axle load distribution is 42:58 – an ideal figure.

Chassis

Whether on a race track or a mountain pass road – the new high-performance sports car from Audi impresses with its dynamics. It executes steering inputs nearly without delay, and it reaches very high speeds in curves. It does this while remaining fully neutral.

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The Audi drive select system and the performance programs dry, wet and snow (standard on the V10 plus, optional on the V10) add new facets to the driving experience. The differences in handling can be experienced, and control limits are shifted far into the dynamic limit range.

The chassis offers greater comfort than in the previous model. Double wishbones made of aluminum – a classic design principle from car racing – are used in the suspensions for all four wheels. Rubber-metal mounts transfer lateral forces into the car body in a defined way, while assuring good elasticity in a longitudinal direction. New transverse link mounts at the front and rear axles enhance comfort, stability and precision. The car's track width is 1,599 mm *(5.2 ft)* at the rear and 1,638 mm *(5.4 ft)* at the front.

The electromechanical rack power steering system has also been redesigned from scratch. It provides differentiated road feedback and also saves a tremendous amount of energy compared to the hydraulic steering system in the previous model. It has a steering ratio of 15.7:1, and power steering assist varies as a function of the vehicle driving speed.

Dynamic steering is available as an alternative for both engine versions. Its superposition gear varies the ratio as a function of vehicle speed between 10.0:1 and 17.5:1. In a parking garage, the steering is very direct, and on the freeway it is indirect and smooth. In the performance programs (standard on the V10 plus, optional on the V10), a fixed ratio of just 13:1 is used. At the curve limit, the dynamic steering system countersteers with tiny impulses to add more stability.

A bit stiffer: the new Audi R8 V10 plus

The chassis tuning differs between the two engine versions – the top version has stiffer springs and dampers on-board (optional on the R8* V10). As an option, Audi can deliver the Audi magnetic ride system in either version – it adapts the operating mode of the dampers to the profile of the road and style of the driver – individually for each wheel at millisecond cycles. A synthetic oil in the pistons of the shock absorbers has very small magnetic particles embedded in it. When a voltage is applied to a coil, a magnetic field is generated in which the particles align transverse to the direction of flow. They thereby restrict the flow of oil through the piston channels.

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Audi magnetic ride is incorporated into the control of the Audi drive select dynamic driving system, which is standard equipment in the new Audi R8. The driver can use this system to vary the mode of operation of key technical components over four basic modes: comfort, auto, dynamic and individual. In the dynamic stage, the quattro drive system assists in executing controlled, safe drifts. The accelerator pedal, steering, shift points and sound are even stiffer, so that the dynamics can be experienced. In the auto mode, on the other hand, traction has priority – this translates into high speed and fast lap times on the race track.

In the performance mode of the new Audi R8 V10 plus (optional on the V10), the driver can use a dedicated satellite button with a turn wheel on the multifunction steering wheel plus to select one of the programs dry, wet or snow.

They too are configured for maximum dynamic performance, and they take the friction coefficient of the road surface into consideration. The Audi drive select setting also influences Electronic Stabilization Control (ESC). On wet or snow-covered road surfaces, for instance, ESC modifies the thresholds of the ASR and ABS control systems accordingly.

Best grip: the wheels and tires

The new Audi R8 is equipped with factory-installed 19-inch wheels. On the V10, the cast alloy wheels have a 5-V-spoke design, while the V10 plus has forged wheels in 5-twin-spoke design in matt titanium look. The tire sizes are 245/35 front and 295/35 rear. As an alternative, Audi offers three other 19-inch versions, one of them for the winter. On the 20-inch wheels – all in 10-spoke Y design, but with different finishes – the tires are 245/30 and 305/30 in size, and optional sport tires are available. Of the four 20-inch versions, one is intended for winter driving. Tire pressure monitoring with direct measurement of tire pressure and temperature is a standard feature.

There are large-size brakes behind the wheels. The standard steel disks of the new Audi R8 V10 have wave-shaped contours (wave design) that make them lightweight. They are internally ventilated and perforated. They are joined to aluminum brake caps by stainless steel pins which prevent the transfer of peak temperatures. Operating at the front wheels are eight-piston fixed calipers and disks 365 mm *(14.4 in)* in diameter; at the rear wheels, four-piston calipers and disks 356 mm *(14.0 in)* in diameter are used. The new electromechanical parking brake activates two dedicated floating calipers.

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380 mm *(15.0 in)* diameter: the ceramic brakes

Audi installs brake disks made of carbon-fiber-reinforced ceramic on the new R8 V10 plus (optional on the V10). The geometry of their cooling channels ensures fast heat dissipation, and the friction ring is bolted to a forged aluminum brake cap. They are 380 mm *(15.0 in)* in diameter in front (with six-piston fixed calipers) and 356 mm *(14.0 in)* at the rear (with four-piston calipers). The ceramic disks are 15.2 kg *(33.5 lb)* lighter in weight than their steel counterparts. They are extremely temperature resistant and have a long service life. The brake calipers differ from one another in color too. The steel brakes are painted in gloss black – or optionally gloss red – and they display R8 logos. The calipers of the ceramic disks shine in anthracite colored paint with the “Audi ceramic” signature.

The Electronic Stabilization Control (ESC) system that is being used is also a new development. It builds up brake pressure so quickly and precisely that its work is hardly perceptible. ESC may be switched over to a sport mode, or it may be deactivated altogether. New system functions include the multicollision brake assist system – a function that assists the driver by performing targeted braking maneuvers after an initial collision to avoid skidding and thereby hazardous secondary collisions.

ESC rounds out the handling properties of the new Audi R8. In fast driving through curves, torque vectoring – which is a software function of ESC – applies minimal braking interventions at the wheels on the inside of a curve. The difference in propulsive forces causes the high-performance sports car to turn into the curve very slightly – making its handling even more precise, sporty and stable. In the dynamic mode, the system is configured for maximum driving enjoyment. It assists in spontaneous turn-in and controlled drifts by active adjustments and slight brake interventions when oversteer occurs.

Exterior design

No other production car from Audi is closer in concept to a race car than the new R8*. The occupant cell that is placed far forward, the strong emphasis of the wheel arches and the long back recall the look of a Le Mans race car – the R 18 e-tron quattro. Compared to the previous model, the car’s length (4,426 mm *(14.5 ft)*), height (1,240 mm *(4.1 ft)*) and wheelbase (2,650 mm *(8.7 ft)*) have not changed significantly, but the width has grown by around four centimeters *(1.6 in)* to 1,940 mm *(6.4 ft)*.

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The influential design ideas of the previous model are expressed in a tauter, more technical and precise way in the new Audi R8. Horizontal lines define the front view. The very sculptural Singleframe radiator grille in honeycomb look – executed in a matt finish on the V10 and in a gloss finish on the V10 plus – has a very broad and low design. Three-dimensionally formed surfaces join it to the wedge-shaped headlights; they emphasize the tension of the design. The four rings are placed on the hood.

37 LEDs per unit: LED headlights with laser spot

Like the grille, the large trapezoidal air inlets also have inserts in honeycomb look. Their two vertical slats match the blade in the headlights that are part of the daytime running lights signature. The vertical blade is anodized blue in the version with the laser spot high-beam lights – a version that supplements the standard LED headlights with their 37 LEDs each.

The laser spot doubles the range of the high-beam light. In each headlight there is a module with four powerful laser diodes that are just 300 micrometers in diameter. They generate a blue laser beam with a wavelength of 450 nanometers. A phosphorus converter converts it into white light with a color temperature of 5,500 Kelvin that is pleasing to the human eye. The laser spot – which is active outside of urban areas at speeds of 60 km/h *(37.3 mph)* and above – offers tremendous advantages in terms of visibility and safety to drivers. An intelligent camera-based sensor system detects other road users and actively adjusts the light pattern to dim the light intensity specifically for them.

Audi combines the new technology with the dynamic turn signals, which are placed along the upper edge of the headlight together with the daytime running lights. Depending on the model, the turn signals are implemented as either individual LEDs or LED blocks. As soon as the driver activates the turn signal, these LEDs light sequentially from inside to out – i.e. in the direction in which the driver is turning.

The side view of the new Audi R8 exhibits taut, clean lines that delineate curved surfaces. The contours above the wheels reference the quattro drive system. The flowing shoulder line connects the wheels with one another while dividing the sideblade in two visual elements – an upper and a lower half.

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The door handles are placed nearly invisibly in the shadow of this line. This new design solution makes the high-performance sports car appear even longer and more dynamic. The light edges on the side sills are recreated in the aerodynamic blades of the Audi R18 e-tron quattro.

The fuel lid is made of aluminum in both engine versions; it is integrated in the upper blade on the right side of the car and has an R8 logo. To open it, the driver presses on the smooth surface to the left of the fuel lid, then the driver presses the nozzle right into the filler neck – just like on a race car, it is no longer necessary to unscrew a cap.

For downforce: the wings of the R8 V10 plus

At the rear, the design also documents the affinity of the new Audi R8 for motorsport – its dominating elements serve to generate downforce. The R8 V10 plus has a large fixed rear wing made of carbon-fiber-reinforced polymer (CFRP); on the R8 V10, the spoiler is electrically extended at a speed of 120 km/h *(74.6 mph)*. The contours on the two sides of the rear window, through which the engine is visible, contribute to smooth air flow over the car.

The diffuser with its distinctive slats is extremely wide and is flanked by the two trapezoidal tail pipes of the exhaust system. They are chrome-plated on the V10 and gloss black on the V10 plus as well as with the optional sport exhaust system. The prominent horizontal lines give the rear body a very wide look. The verticals run diagonally downward and outward – forming a triangle and emphasizing the stance of the new Audi R8 on the road.

The large inlet openings for the engine compartment – also in honeycomb look with upright slats – form a single visual unit together with the lights. Their fork-like contours produce a distinctive red signature when the daytime running lights are activated. The adaptive brake light flashes at a faster frequency with hard braking. Each tail light integrates 118 individual LEDs, which generate an absolutely uniform light pattern. The dynamic rear turn signal lights are a standard feature.

Audi offers its new high-performance sports car in eleven colors. The solid finish paints are: dynamite red, ibis white and Vegas yellow. The metallic tones are: camouflage green, floret silver, mythos black, Suzuka gray and tango red.

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The color palette is rounded out by the pearl effect paint Daytona gray, the crystal effect macaw blue and the matt finish camouflage green. The Audi exclusive program lets customers have any paint colors blended according to their wishes.

Six versions of sideblades are available – the paint colors are: ice silver, metallic (standard on the R8 V10), Kendo gray, mythos black, oxygen silver and titanium gray, matt as well as one version in gloss CFRP (standard on the R8 V10 plus). As an alternative, customers may choose any color for the sideblades in the Audi exclusive program.

Audi Space Frame in multimaterial mixed construction

Like the previous model, the new R8* also has a body in ASF (Audi Space Frame) construction – which is synonymous with extreme lightweight design. It weighs just 200 kg *(440.9 lb)*, which is ten kilograms *(22.0 lb)* less than before – thanks to a concept being used at Audi for the first time which combines aluminum and carbon-fiber- reinforced polymer (CFRP). Large components of the occupant cell consist of CFRP, while the front and rear body modules are built exclusively of aluminum. The new multimaterial ASF forms the basis for the lightweight design concept of the high-performance sports car.

In its lightweight design strategy, Audi does not just rely on a single material, but instead on an intelligent material mix – according to the motto “The right material in the right amount at the right place.” The new material CFRP is used where it can attain better results than aluminum. CFRP is used for the rear wall, the center tunnel and the three-part B-pillars. These large components, which are produced in the efficient resin transfer moulding (RTM) process, form the high-strength backbone of the ASF that is nearly torsion-free. They account for a 13 percent share of the ASF.

CFRP parts differ from one another in their structure, depending on where they are used. Audi fully exploits the material’s specific strengths. In the crossmember of the rear wall, where maximum strength in a transverse direction is what counts, the fiber layers are largely aligned unidirectionally. Up to 14 of them are placed on top of one another to form a five millimeter *(0.2 in)* thick sheet with very high tensile strength of 3,950 MPa (megapascals). In the B-pillar reinforcements, on the other hand, the layers are aligned in all directions to support both longitudinal and transverse loads. The tensile strength of these parts is 900 MPa.

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The front and rear body modules of the new R8 are constructed entirely of aluminum – from semi-finished goods that include castings, profiles and sheets. The cast nodes, which make up 20.8 percent of the ASF, have complex interior geometries that make them well suited for absorbing large forces while offering plenty of versatility and design freedom. The A-pillar nodes, for example, join key parts of the front body and the occupant cell to one another. They consist of a new, high-strength alloy with a tensile strength of 350 MPa.

The extruded profiles, together with the cast nodes, form the framework for the front and rear body modules. They have a 47.2 percent material share in the ASF. The profiles too offer a lot of design flexibility. One example is the upright profile between the suspension strut mount and the chassis joint of the rear axle. Over its approximately 60 cm *(23.6 in)* of length, its wall thickness varies between 1.5 mm *(0.1 in)* and 6.2 mm *(0.2 in)*, which saves 1.3 kg *(2.9 lb)* in weight. Audi also took new paths in lightweight design with the structural struts that stiffen the rear body – oval aluminum profiles that weigh just one kilogram *(2.2 lb)* form the upper structure.

Along with this optimization of topologies, ASF developers also performed a new type of functional integration. Cast nodes from the new, high-strength alloy join the control arms directly and rigidly to the ASF. The floor of the luggage compartment is made of sheet aluminum, and it serves as a shear area that improves crash properties.

Made entirely of aluminum: the exterior skin

The outer skin of the new Audi R8, including doors and lids, is produced entirely of aluminum. Alloy sheets make up an 11.2 percent share of the ASF and are primarily used for the floor of the occupant cell and its bulkhead. A 0.6 percent share is steel, 0.5 percent other materials and 6.7 percent fasteners.

In the ASF of the new Audi R8, the combined length of the welds between the aluminum components is a full 89 meters *(292.0 ft)*. The aluminum and CFRP are joined exclusively by cold methods – the ASF contains 270 semi-hollow punch rivets, 207 blind rivets, 241 metric screws and 270 self-tapping screws. Cathodic dip coating, an engineered adhesive and a special seal ensure that the metal alloy does not corrode in contact areas with the CFRP.

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Compared to the previous model, the ASF of the new Audi R8 has been significantly improved in all criteria. It has gained 40 percent in static torsional rigidity – which makes it an excellent material for ensuring precise handling, high crash safety and acoustically quiet vibration behavior. The new multimaterial ASF attains a top figure in the sports car segment for its lightweight index – a measure of the relationship between weight, size and stiffness. If Audi had built it in the previous aluminum technology, the ASF would have been 32 kg *(70.5 lb)* heavier.

Aerodynamics

Aerodynamic development of the new R8* was particularly focused on one parameter that plays a predominant role in car racing – downforce, i.e. the force that presses the car down onto the road and enables high speeds through curves. Here, the Audi R8 V10 plus enters a new dimension. At its top speed, the car generates 140 kg *(308.6 lb)* of downforce, of which 100 kg *(220.5 lb)* is at the rear axle.

The c_D figure of the new Audi R8 V10 plus is 0.36, and its low height results in a relatively small frontal area of 2.01 m^2 *(21.6 sq ft)* – which is a requirement for the 330 km/h *(205.1 mph)* maximum speed that the top version can reach.

On the exterior skin, the rear spoiler is very important for downforce. On the R8 V10 plus it is implemented as a fixed wing, and its profile was derived from Audi DTM race cars. The wing works together with the large diffuser on the underbody to create a trailing edge that generates as little turbulence as possible.

The diffuser is located at the height of the rear axle. It takes the accelerated air from the underbody and brings it back down to the speed of the ambient air without excessive turbulence. This suction effect lets the air flow faster, heightening downforce. Two venturi spoilers guide the high-speed air into the diffuser and nearly double its effectiveness. In the diffuser, longitudinal ribs channel the air flow so that it does not concentrate in the middle.

For good steering response: 40 kg *(88.2 lb)* of downforce at the front axle
Drivers perceive the 40 kg *(88.2 lb)* of downforce that the new Audi R8 V10 plus generates at the front axle in a positive way, even on fast straight-aways. This downforce prevents the steering from becoming light.

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In the vicinity of the front axle there are two small diffusers which divert air through the wheel housings and thereby also serve to cool the brakes. Each of them works together with two round-bodied elements at the leading edge of the air flow and venturi spoilers.

The underbody of the new high-performance sports car, including the propeller shaft, is nearly fully enclosed by a smooth cover. In the rear body, this cover also contributes to lateral stiffness. Under the engine, nozzles known as NACA nozzles guide the cooling air to the V10 engine and the seven-speed S tronic. The pan of the dry sump lubrication system is not covered.

The V10 draws its inlet air via a screen under the rear window and via two long connecting pieces that lead to the sideblades. Flaps manage the switching tasks and thereby control inlet noise. The engine compartment is temperature controlled in multiple ways: by narrow louvers next to the rear window, large openings under the tail lights and a narrow opening slot above the diffuser. On the R8 V10 plus, another outlet is added beneath the rear wing. In the front body, the cooling air flows through enclosed channels with little turbulence – another solution from car racing.

Interior

The taut lines of the new R8* can also be seen in the interior. It stands for aesthetic lightweight design, which is a fundamental technical principle at Audi. Its most eye-catching element is the “monoposto” – the large curved arch that encircles the area in front of the driver’s seat and conveys the atmosphere of a race cockpit. It also has knee pads in its lower area. The “monoposto” encloses the Audi virtual cockpit, which is integrated into a freestanding housing.

The entire instrument panel has a lean and lightweight look; it appears to hover without being joined to the center tunnel console. The new Audi virtual cockpit replaces the central MMI monitor that the previous model still had. In its place there is a large air vent and the control panel for the deluxe automatic air conditioner. Its cylindrical controls bear a visual resemblance to the jet engine turbines of an airplane, while the vents with their vertical louvers recall the air intake of a race car.

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The wide console of the center tunnel is also oriented toward the driver. It has a row of switches for secondary functions and the newly designed, low-profile gear lever for the seven-speed S tronic. Behind it is the MMI terminal with MMI touch – the touch-sensitive rotary/push-button switch. A large storage compartment, which can be equipped with the Audi phone box as an option, completes the features.

The long wheelbase of 2.65 meters *(8.7 ft)* and shoulder width of 1.40 meters *(4.6 ft)* make the interior of the new Audi R8 spacious. Under the hood, there is a 112-liter *(4.0 cu ft)* luggage compartment. The area behind the seats, upon which a golf bag can be stowed, offers an additional storage capacity of 226 liters *(8.0 cu ft)*.

Operating concept: like in a race car

The driver sits in the new Audi R8 like in a race car. The entire operating concept focuses on the driver alone, who can operate all key functions without having to take the hands off the steering wheel or look away from the road.

The multifunction steering wheel plus has two large round satellite buttons – in addition to its push-buttons for the MMI. One is used to start and stop the engine, while the other is used to select the basic modes of Audi drive select. The performance steering wheel in the Audi R8 V10 plus (optional on the V10) adds two more buttons: one to control the exhaust system and the other to select the dry, wet or snow program of the performance mode.

The newly conceptualized, low-mounted seats integrate the driver and passenger into the vehicle perfectly – in a sporty, extended position. The new R8 V10 has standard sport seats with integrated head restraints on-board. They have power adjustments for height and seat back angle. Heated seats are standard. Optional features include power longitudinal adjustment and pneumatic functions for the lumbar supports, seat and backrest side bolsters.

On the new Audi R8 V10 plus, bucket seats with very high side bolsters are standard (optional on the V10). In the upper area of the seat back there is an embossed R8 logo. These seats offer power height adjustment, and longitudinal adjustment is manual. Each of the newly developed bucket seats follows a strict lightweight design approach and offers comfortable sportiness. Side airbags are standard with both types of seats.

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The upholstery material in the R8 V10 is a combination of black Alcantara and leather. Audi can deliver fine Nappa leather quality as an option (standard on the V10 plus), and customers can choose from two color schemes. Together with the black instrument panel, there are the sporty tones black, rotor gray and express red. In combination with the granite gray cockpit, the elegant colors Vermont brown and pergament beige are also offered. The black covers may be upgraded to include contrasting stitching that matches the exterior paint.

In the fine Nappa leather interior, Audi offers versions that provide upholstery for various features. They include a dynamic diamond pattern which gives the seats a visually lean appearance – the diamonds grow larger from top to bottom. The options line-up is rounded out by two leather packages and four Alcantara versions for the headlining, including two with diamond pattern.

Matt CFRP is used on the Audi R8 V10 plus for parts of the “monoposto” architecture and for inlays that appear in the doors and on the instrument panel and center tunnel console. On the R8 V10 they are in anthracite colored anodized paint. As an option, Audi can also deliver this in CFRP, and in both engine versions it is also available for the housing of the Audi virtual cockpit and the air vents. Anthracite-colored titanium paint and a black piano finish look are offered as alternatives. On the top model, the pedals and foot rests are stainless steel (optional on the R8 V10).

In addition, quattro GmbH offers its customers a comprehensive line-up of options for further customizing the interior. For instance, illumination and personalization are available for the aluminum door sill trims. Customers can choose from many different upholsteries, trim panels and colors – the selection is nearly unlimited.

Regardless of which colors and materials the customer selects, the interior finish reflects the high Audi craftscale quality. It can be discerned in all of its details – from the precise decorative stitching on the upholstery to the narrow, accurate parallel seams to the climate control unit in piano finish look.

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Audi virtual cockpit and the new MMI

The new R8* presents two innovative brand technologies in its operating concept. The Audi virtual cockpit is the digital instrument cluster of the future, and its MMI offers a new, easy-to-understand operating logic.The TFT display of the Audi virtual cockpit has a 12.3-inch diagonal and a high resolution of 1,440 x 540 pixels. It displays razor-sharp, bright and contrast-rich images that are free of reflections. Working in the background is a Tegra 30 chip from Audi partner NVIDIA. It was designed for low electrical consumption and has separate audio, video and image processing units. Its working memory is two gigabytes.

The Audi virtual cockpit presents all information with attractive and elaborately rendered effects. The needle of the rev counter, for instance, is computed 60 times per second, so it moves absolutely fluidly, even when revving the engine under full load. Scrolling operations through lists are based on a physical model that considers inertia, elasticity and damping. The color scheme of the display varies according to the basic menu that is selected – it is orange for the media menu and green for the phone menu.

The driver can switch between two user interfaces by pressing the “View” button on the steering wheel. In infotainment mode, a large central window offers a lot of space for the navigation map or lists from the phone, radio or audio areas. In this mode, the rev counter and speedometer are shown as small round instruments. In the classic view, the central window is smaller, and the instruments appear about the same size as analog gages.

In another third view, the performance mode, a large, central rev counter dominates the screen (standard on the R8 V10 plus, optional on the R8 V10). When the seven-speed S tronic is being operated in manual mode, the rev counter’s scale is displayed with a color background at higher engine speeds. Five segments, and at the end a red segment that indicates the limit of 8,500 rpm. The Audi virtual cockpit also displays a shift light which informs the driver that the engine speed limit has been reached.

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Tire temperature and g-meter: the auxiliary gages

The driver can place various gages around the rev counter. Power and torque are shown as percentages. The g-meter, which ranges up to 1.5 g, visualizes the forces that occur while driving through curves, braking or accelerating. A lap timer can record up to 99 laps and evaluate times. As in the race car, the driver also gets information on the status of key technical parameters – the temperatures of the engine oil and transmission fluid and tire air pressures and temperatures.

The multi-media interface (MMI) in the new Audi R8 has an entirely new menu structure. It provides intuitive and easy operation with flat hierarchies. As in a smartphone, intelligent logic replaces branched menu trees, and frequently used functions can be accessed in just a few steps. A special highlight is MMI search, which is available for all basic menus and is operated by user input of free text. It generally generates answers after just a few letters have been input, taking the car's current location into consideration.

Entirely new: the MMI terminal

The MMI terminal on the console of the center tunnel has a completely new design with a highly precise rotary/push-button control. The top surface of the control features the touch-sensitive MMI touch element. It lets the driver input characters as well as scroll and zoom with more than one finger. In front of and behind it are the toggle switches for the most important basic menus, the home button and the back function.

Buttons to the left and right of the rotary/push-button are used to open intelligently linked functional and shortcut menus which supplement many areas of operation. The driver can call up traffic information from the map menu, for instance, or the radio band from the radio menu. In navigation, the driver can save an entered destination in the favorites list or have parking spaces in the vicinity displayed.

Voice control has also undergone significant advanced development. The voice control system understands a large number of everyday expressions. To call a contact that is listed in the phone menu, commands such as "Connect me with Thomas Müller" suffice. The navigation system also responds to natural language inputs ("Where can I find a fuel station?"). This also applies to the basic menus Radio ("Play Radio Galaxy") and Media ("I would like to hear music from my cell phone.").

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The driver of the new Audi R8 can also control all MMI system functions from the steering wheel – with the exception of wiping and scrolling gestures. Using the switches and the roller on the left steering wheel spoke, the driver scrolls through the menus for the on-board computer, audio system, phone and navigation. On the right side of the steering wheel are the volume control, voice control button, express phone button and a user-configurable favorites button.

Infotainment and Audi connect

Audi delivers the Audi R8* with the top-version of the MMI as standard equipment – MMI navigation plus with MM touch. As versatile media centers, they integrate two SD card readers, the Audi Music Interface (AMI), a DVD drive, aux-in port and Bluetooth interface for voice control and audio streaming. The range of features is complemented by a 10-GB flash memory for music data, the Audi sound system with five loudspeakers, and a speed limit indicator that is based on data of the navigation map.

MMI navigation plus offers access to the voice control of a coupled smartphone. It shows the cell phone's incoming emails and text messages and reads them aloud. Another attractive service is online updates for the navigation map – they are made available every six months, and the first five are free-of-charge. The standard seat belt microphones for the driver and front passenger are used for telephoning and voice control of the MMI. Three small microphones are integrated into the belts for top quality sound.

MMI navigation plus with MMI touch draws upon the computing power of the Audi modular infotainment platform (MIB). In its second generation, which is being used in the new R8, it utilizes the Tegra 30 processor from NVIDIA. The Tegra chip in the MIB works together with its counterpart in the Audi virtual cockpit at computing cycles at speeds of thousandths of a second.

Always online: Audi connect

An ideal complement to MMI navigation plus is the Audi connect hardware module that is being offered in the Audi R8 for the first time. This module produces a connection to the internet – whenever possible via the fast LTE data transmission standard. The passenger can surf and e-mail freely on a smartphone or tablet using the integrated Wi-Fi hotspot, while the driver benefits from customized online Audi connect services that are delivered to the car.

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The line-up of Audi connect services ranges from navigation with Google Earth and Google Street View to online media streaming and real-time traffic information. The driver can adapt many of these services to personal needs through a myAudi account. In addition, the Audi MMI connect app provides direct networking between the car and smartphone.

Attractive solutions round out the infotainment options. They include a tuner for digital radio reception and the Audi phone box, for a wireless interface between the cell phone and the car's antenna. The Bang & Olufsen Sound System will appeal to hi-fi customers with high audiophile standards. Its 550-watt amplifier drives 13 loudspeakers; a subwoofer is mounted to the bulkhead at the right front wheel housing. The woofers are mounted in the doors with anodized aluminum trim brackets. When it is dark, they are illuminated by LED accent lighting.

Equipment

Ordering for the new Audi R8* began on May 13, 2015, and the car will be launched in the third quarter in Germany and other European countries. The R8 V10 costs 165,000 euros, and the "plus" model is priced at 187,400 euros.

Its equipment features are extremely extensive – the drivetrain and chassis equipment in particular underscore the dynamic character of the high-performance sports car. Engine power is transmitted to the wheels via a seven-speed S tronic and a quattro permanent all-wheel drive system with torque vectoring. The car comes with factory installed 19-inch wheels or optional 20-inch wheels.

The standard equipment package is rounded out by the Audi drive select system with its four basic modes, the performance program for dry, wet or snow conditions (standard on the V10 plus, optional on the V10) and the multicollision brake assist system. Dynamic steering and Audi magnetic ride damper control are available as options.

The numerous exterior features clearly express the power of the high-performance sports car. LED headlights and dynamic rear turn signals are standard, and laser spots for the high-beam headlights are available as an option together with dynamic front turn signals.

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Add-on parts of the R8 V10 plus such as sideblades are made of CFRP. The engine compartment hood can also be delivered in this material. The body colors are new and may be combined freely with the color of the sideblades. In addition, quattro GmbH offers customized paint finishes as part of its Audi exclusive program.

The operating concept of the new high-performance sports car is strictly tailored to the driver. The fully digital Audi virtual cockpit can be controlled from the R8 sport leather steering wheel with multifunction plus and two satellite buttons (on the R8 V10) or the R8 performance leather steering wheel with multifunction plus and four satellite buttons (standard on the R8 V10 plus, optional on the R8 V10).

MMI navigation plus with MMI touch is also standard equipment, and a high-quality voice control system rounds out its operating logic. Its sound is played back over the Audi sound system. Optional equipment for rounding out the infotainment system includes the Audi connect module, a digital audio tuner, the Audi phone box and the Bang & Olufsen Sound System.

The driver and passenger sit on sport seats that are heated and feature partial power adjustment (standard on the R8 V10, optional on the R8 V10 plus) or bucket seats (standard on the R8 V10 plus, optional on the R8 V10). They may be upholstered in a leather/Alcantara mix or with fine Nappa leather. Audi makes numerous options available to individualists, including various leather interiors and packages, seat upholstery with diamond pattern and CRFP inlays. In the interior in particular, quattro GmbH is able to satisfy even unusual wishes as part of its Audi exclusive customization program.

Other standard features underscore the dynamically luxurious character of the new R8 – deluxe automatic air conditioning, anti-theft warning system, LED interior lighting, convenience key, park assist plus and cruise control. As options, Audi can deliver an interior lighting package, high-beam assist, a storage package and a reversing camera. Passive safety features of the new R8 include two front airbags, two head airbags and two thorax side airbags as well as the integral head restraint system.

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Production

The new Audi R8 is manufactured under the auspices of quattro GmbH, a 100-percent subsidiary of AUDI AG at its “Audi Böllinger Höfe” production facilities in Heilbronn. The AUDI AG investment in its facility in the immediate vicinity of its tradition-rich Neckarsulm production site amounts to a figure in the double-digit millions.

As many as 500 highly qualified employees work in the body manufacturing and assembly areas at the production site which has 30,000 m^2 *(322,917 sq ft)* of production floor area. Just as for the previous model, production is organized as a flexible handcrafting process. quattro GmbH is further extending its production competence in limited production runs here. In body manufacturing, the initial focus is on the aluminum parts of the ASF. In a first step, specialists weld together the front body module, middle floor and rear body module – which are made of cast aluminum and extruded aluminum profiles – and they then join the three modules to the underbody. Robots perform joining processes that involve cold joints such as rivets and screws, while workers execute welding tasks. The body continues to grow with the addition of the greenhouse (the area of the glass surfaces) and the roof. Humans and robots work closely together in installing the CFRP parts.

High-tech transport: self-propelled assembly skids

The finished body is transferred to the assembly area on a self-propelled assembly skid, which is known as a driverless transport system (DTS). The DTS, an innovation at Audi, utilizes high-power storage capacitors as its energy storage medium, and it navigates through the production floor areas via laser scanner and RFID (Radio Frequency Identification) chips. In the assembly area, which is laid out as a U-shaped chain, employees perform a large share of the handcraft work in 15 cycles each lasting around 30 minutes.

Flexibility enjoys an extremely high priority at “Audi Böllinger Höfe” – in body manufacturing employees also produce derivatives such as the R8 LMS race car in parallel to the production cars. The assembly area is also configured for quick modifications. The cars move through many areas of the hall on the DTS. There are no overhead conveyors or a classic “marriage” station. The drive unit and suspensions are preassembled and installed separately from one another.

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The latest ergonomic standards apply to assembly of the new Audi R8. The DTS skids can be variably adjusted up to 1.2 meters *(3.9 ft)* in height. The brake and coolant lines are laid out in the underbody on a lifting/pivoting platform that rotates the car 90 degrees

Initial operation of the newly produced R8 is performed at the testing center and comprises six separate cycles. Afterwards, each new R8 must successfully complete a stringent quality approval process on the plant's own test track. After this, an approximately one-hour test drive is conducted on public roads which also includes freeway driving. Only then is the new sports car released for delivery to the customer.

The Audi R8 e-tron

340 kW of power, a 0 to 100 km/h *(62.1 mph)* sprint time of 3.9 seconds and a driving range of up to 450 km *(279.6 mi)* – Audi has further developed the R8 e-tron*, an electric high-performance sports car comprehensively. The high-performance sports car combines its purely electric high-performance drive system with radical solutions in lightweight design.

Visually, the 4.40 meter *(14.4 ft)* long Audi R8 e-tron can be made out by the unique lighting solutions on its air inlets, front apron and sideblades. The car's exterior skin, painted in magnetic blue, combines body parts made of aluminum and CFRP – such as the front and rear lids. Thanks to aerodynamic modifications – to the cooling air inlet, rear spoiler, diffuser, underbody and sideblades, for instance – the drag coefficient (c_D) of the R8 e-tron is just 0.28. Its Audi Space Frame (ASF) is based on the multimaterial design of the V10 version, which has been extended by a rear body module made of CFRP. Despite its low weight, the corrugated walls that form the luggage compartment can absorb an extreme amount of energy in a rear-end collision.

The T-shaped battery is structurally integrated in the center tunnel and is mounted behind the occupant cell – this location offers a low center of gravity and an axle load distribution of 40:60 (front/rear). The high-voltage battery, which Audi manufactures itself at its battery technology center, is based on lithium-ion technology. The liquid-cooled battery consists of 52 modules. Compared to the first e-tron technology demonstrator, the energy capacity of the approximately 600 kg *(1,322.8 lb)* battery system was increased from around 48.6 to 90.3 kWh – without any modifications to the package.

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Thanks to its high energy density, which was increased from 84 to 152 Wh/kg, the R8 e-tron can be driven up to 450 km *(279.6 mi)* on a single battery charge – its previous range was 215 km *(133.6 mi)*. In the Combined Charging System (CCS) for charging with DC or AC electricity, the battery can be fully charged in well under two hours. The driver can control this process remotely by smartphone, provided that the relevant Audi connect app has been installed on it.

Immense tractive power: 920 Nm *(678.6 lb-ft)* of torque

The two electric motors on the rear axle each output 170 kW and 460 Nm *(339.3 lb-ft)* of torque. The R8 e-tron, which weighs just 1,841 kg *(4058.7 lb)* empty (without driver), sprints from 0 to 100 km/h *(62.1 mph)* in 3.9 seconds and can accelerate to an electronically governed top speed of 250 km/h *(155.3 mph)* while developing its unique e-sound. Targeted torque vectoring – a need-based distribution of drive power between the rear wheels – gives the car excellent stability and dynamism.

Intelligent energy management and an electromechanical brake system at the rear axle ensure high rates of energy recuperation. The suspension springs consist of glass-fiber-reinforced polymer (GFRP), and the anti-roll bar is made of CFRP.

The R8 e-tron rides on aerodynamically optimized, 19-inch aero wheels with a gloss turned finish that were specially designed for this car. Size 225/40 R19 tires on the front wheels enable precise steering response. On the rear wheels, the high torque of the electric motors is transferred to the road by size 275/40 R19 tires. Specially developed to meet the needs of the high-performance electric sports car, the tires combine sporty driving properties with low rolling resistance. Sporty 20-inch wheels for the production R8 are available through the Audi Genuine Accessories program.

In the finely crafted interior, the R8 e-tron offers illuminated door sill trims, folding bucket seats and a specially configured Audi virtual cockpit. A heat pump removes waste heat from electrical components for thermal management and for interior climate control – an important efficiency module of the overall concept.

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Audi is also utilizing the new development stage of the R8 e-tron as a mobile high-tech laboratory. Here, it plays an important role in developing concepts and components for electric mobility of the future. Interested customers will be able to order the car later this year, and it will be produced in handcrafted quality at the Audi “Böllinger Höfe” production site.

The new Audi R8 LMS

Making its debut at the same time as the new R8* production car model is the new edition of the Audi R8 LMS – a GT3 race car. Specialists from motorsport and production collaborated closely in its development. As in the first generation, the share of common parts is just under 50 percent, and both cars have made significant performance gains. The body of the R8 LMS is manufactured together with the production model at “Audi Böllinger Höfe”.

The body of the GT3 race car is based on the point-reinforced multimaterial ASF that is made of aluminum and CFRP. It is supplemented by a safety cage that is assembled before the body gets its roof. The Audi safety seat, known as the PS1, is solidly joined to the chassis, which increases rigidity. The steering column and pedals can be adjusted. A new type of CFRP element in the rear body protects the driver in case of a rear collision. With the exception of the roof, the exterior skin consists of CFRP, and the homologation weight of the rear-wheel drive race car is 1,225 kg *(2,700.7 lb)*.

The race car’s V10 engine is nearly identical to the production car engine; it only omits the manifold fuel injection. Its power output is around 430 kW (approx. 585 hp) – depending on the specific race regulations and the air restrictor that is specified in them. Audi is planning on 20,000 km *(12,427.4 mi)* as the engine rebuild interval. The newly designed six-speed transmission, which is pneumatically shifted via paddle shifters, is around 20 kg *(44.1 lb)* lighter than the previous unit; the clutch features electrohydraulic activation. Classic, lightweight race car wishbones guide the wheels, which are 18 inches in size according to race rules. The race car also uses special steering components and wheel bearings.

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Special strength: aerodynamic efficiency

One of the top qualities of the new Audi R8 LMS, which is 4.58 meters *(15.0 ft)* long and 1.17 meters *(3.8 ft)* high, is its aerodynamic efficiency. The large diffuser in the underbody – that is covered by large smooth panels – generates strong downforce, which enables a smaller rear wing. Compared to the previous model, the aerodynamic drag coefficient has been lowered by 20 percent. The flow of cooling air has been improved in all areas – in the front body and in the cockpit.

Today, the new Audi R8 LMS already conforms to GT3 race regulations that take effect in 2016. Just ten weeks after its world premiere at the Geneva Motor Show, the R8 LMS claimed victory at the Nürburgring – making a dazzling entrance on the 24 hour racing scene.

Fuel consumption of the models named above:

Audi R8 Coupé V10 plus 5.2 FSI quattro (449 kW):
Combined fuel consuption in l/100 km: 12,3** (19.1 US mpg);
Combined CO_2-emissions in q/km: 287** (461.9 g/mi)

Audi R8 Coupé V10 5.2 FSI quattro (397 kW):
Combined fuel consuption in l/100 km: 11,4** (20.6 US mpg);
Combined CO_2-emissions in q/km: 272** (437.7 g/mi)

Audi R8 e-tron:
This car is not yet on sale. It has not yet been homologated and is therefore not subject to the 1999/94/EG guideline.

** Fuel consumption and CO_2 emissions data as well as the efficiency classes are dependent on the choice of wheels and tires.

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