

**Der Golf.**

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**WORKSHOP**

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**Das Auto.**

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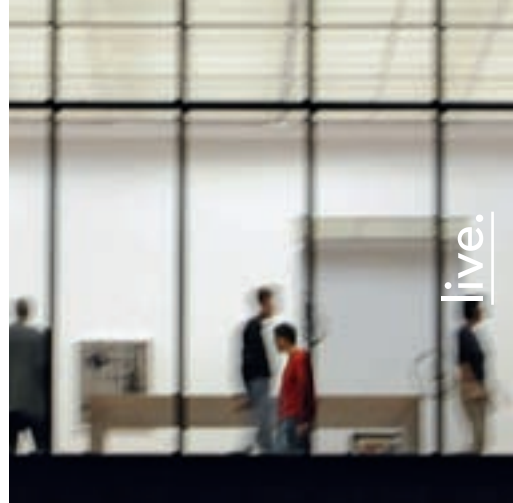


























# MQB

**Modular Transverse Matrix**

**-100 kg**

# Golf

Volkswagen

**The new Golf. Das Auto.**

**Workshop: “Perfection in the details”**

Wolfsburg, August 2012



## Key aspects

The new Golf. Perfection in the details.

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**Emission**  
**-23%**



## **The new Golf – success in overcoming the upward weight spiral**

Innovative lightweight design: new Golf weighs up to 100 kg less than the previous model

Sustainable mobility: fuel consumption and emissions reduced by up to 23 per cent

# TDI

# 3.8l/100 km

**Wolfsburg, August 2012.** The countdown to the world premiere of the new Golf on 4 September in Berlin has started. For Volkswagen the debut of the seventh Golf represents the beginning of a new era: For the first time, a car has been developed in Wolfsburg that is based on the pioneering Modular Transverse Matrix and exploits its new potential to produce the best possible Golf. The results: although the new Golf has been made more spacious, safer and more comfortable, Volkswagen was able to reduce its weight by up to 100 kg compared to the previous model and, in alliance with two new engine lines, its fuel consumption and emissions have been reduced by up to 23 per cent.

A significant improvement in fuel economy is attributable to innovative lightweight design. Consider the petrol engines: the new Golf 1.4 TSI with a powerful 103 kW / 140 PS and cylinder deactivation has a combined fuel consumption of just 4.8 l/100 km (112 g/km CO<sub>2</sub>). Consider the diesel: the world of the TDI begins at 77 kW / 105 PS and delivers a combined fuel consumption of just 3.8 l/100 km for an emissions value of 99 g/km CO<sub>2</sub>. Technically, the Golf shines with other new features such as proactive occupant protection, fatigue detection, the Front Assist safety system with integrated City Emergency Braking function and a standard multicollision braking function that can avoid one-fourth of all accidents involving personal injury. And so, the latest generation of the Golf, a model of which over 29 million units have been built so far, is also advancing to become a technology leader in the compact class and one of the most advanced cars in the world.

**Reversing the upward weight spiral.** The reversal of the upward weight spiral by eliminating up to 100 kilograms – without making the vehicle more expensive by the use of alternative materials – is a master technical achievement in the compact class. To get a feeling for how much 100 kg represents in carmaking: the new base engine, a 1.2-litre petrol engine (TSI), weighs 112 kilograms. Volkswagen has saved nearly the weight of an entire engine – less

about 10 per cent. By the way, the kerb weight of the new seventh generation Golf is about equal to that of the fourth generation of 1997.

And so this car, hundreds of thousands of which are sold worldwide every year, helps to reduce the environmental impact of vehicles on every continent. Forecasts indicate that the new Golf – with a reduction in CO<sub>2</sub> emissions of 13.9 per cent averaged over the entire engine range – will save 119,000 metric tonnes of CO<sub>2</sub> annually in Europe. Progress of this kind does not just fall from the sky; it has to be prepared by long-sighted actions – by innovative vehicle conceptualisation, selection and processing of the materials used and progressive production methods.

**Democratisation of progress.** However, the hunt for every last gram should not mean that progress is made in one area while steps backwards are taken in others. And here too Volkswagen is demonstrating that more than ever the Golf stands for a democratisation of progress and perfection in details – with a plus in space (additional legroom in the rear and 30 litres more cargo space), new pioneering safety systems, refined ergonomics and a completely new world of information and entertainment systems.

**CO<sub>2</sub>**  
**- 119,000t**

# - consumption



## **100 kg less weight reduces fuel consumption significantly**

Body-in-white weighs 23 kg less thanks to progressive design

Innovative manufacturing methods reduce weight and enhance safety



# FEM

**Finite Element Method**

**Wolfsburg, August 2012.** Saving up to 100 kg in weight is a complex task, especially in the compact class. The fact is: not every carmaker is pursuing the route of lightweight design – searching for every last gram – as methodically or thoroughly as Volkswagen. The reason is clear: intensive research and development work costs money. If the base price of the seventh generation Golf turns out to be lower than that of the previous model (Volkswagen will announce prices at the world premiere in Berlin), then this will be a reflection of the innovative power of this brand.

#### Overall vehicle – how weight savings add up to 100 kg

When the Golf is partitioned into the areas of electrical, special equipment, engines, running gear and superstructure, an analysis yields the following distribution for these 100 kg:

- 3.0 kg Electrical
- 12.0 kg Special equipment
- 22.0 kg Engines
- 26.0 kg Running gear
- 37.0 kg Superstructure

This shows that the most potential for lightweight design lies in the superstructure – the car body and standard features. It is quite interesting to look at the details of these 37 saved kilograms, because it shows how lightweight design that is compatible with large-scale production can be achieved in 2012.

### Superstructure – how savings add up to 37 kg

- 0.4 kg Dashboard
- 1.4 kg Module cross-member (beneath dashboard)
- 2.7 kg Air conditioning
- 7.0 kg Front and rear seats (depending on version)
- 23.0 kg Body
- 2.5 kg Miscellaneous

**Dashboard.** 0.4 kg doesn't sound like much. But this is where perfection in the details comes into play. If 0.4 kg is simply overlooked, then in the final analysis it would not be possible to reduce weight by a total of 100 kg. Volkswagen not only succeeded in making the dashboard 20 percent lighter thanks to a new thermoplastic foam injection process – the load-bearing structure beneath the elegant surface consists of this material – but it simultaneously made it 20 per cent more rigid. The wall thickness of the part is reduced in an initial production step; right after injection of what is referred to as the plastic melt, the wall thickness is further increased in the tool so that a propellant (comparable to the yeast in bread dough) contained in the plastic melt can expand. This gives the finished part a sandwich-type structure that is (as mentioned) 20 per cent stiffer and 0.4 kg lighter in weight.

**Module cross-member.** 1.4 kg is another contribution towards overcoming the upward weight spiral. The module cross-member, to which both the steering column and the dashboard are mounted, weighs 5.8 kg. A weight reduction was achieved by a lightweight design that utilises steel components. Based on an analysis by Finite Element Method (FEM) computations, the structure of the module cross-member was designed to be as lightweight as possible and as strong as necessary. Optimal steel wall thicknesses and

structural design measures such as specially worked in corrugations improved the rigidity of the cross-member, on the one hand, and reduced its weight by the aforementioned 1.4 kg. Utilising methods such as the Finite Element Method, engineers at Volkswagen are essentially emulating examples found in nature; nature is able to attain an astonishing ratio between the cross-section of a part's structure and its rigidity – e.g. in a stalk of grass or grain. That is the right path.

**Air conditioner.** The entire air conditioning system of the Golf was redesigned and is 2.7 kg lighter. Independent of its weight, all of the Golf air conditioning units with their highly efficient refrigerant cycles set standards in terms of comfort and efficiency, because they run very quietly (up to -5 dB(A)), reach the desired temperature significantly faster and are very energy-efficient (up to -4 Amperes) due to new type of blower control with intelligent climate control. The 2.7 kg weight reduction is achieved by such design modifications as optimised wall thicknesses of various system components, reduced diameters of pressure lines, a new fastening system and a weight-optimised high-performance heat exchanger.

**Seating system.** Along with numerous minor modifications in the area of seats, weight was reduced – especially in the backrests at the rear – to save a total of up to 7 kg. Once again, the Finite Element Method (FEM) and high-strength steels in conjunction with laser welding made it possible to optimise wall thicknesses and profile geometries. Engineers realised weight savings of over 15 per cent by these measures and by using lighter backrest latch mechanisms.

**Body.** The body must be strong and rigid to guarantee optimal safety and maximum comfort. Nonetheless, its structure should remain athletically lean, so that the overall vehicle is lightweight and efficient. Strong yet lightweight – harmonising these two

# TAILORED BLANKS

parameters continues to be one of the greatest challenges in the automotive world. However, lightweight design based on extremely expensive materials – such as aluminium, magnesium or even carbon fibre materials – was out of the question, because a car like the Golf needs to remain affordable for millions of people. That is why Volkswagen relies on the synergies of the Modular Transverse Matrix (MQB), innovative utilisation of high-strength steels and advanced production methods to attain its goal without added costs. A 23 kg reduction in weight – with more stringent crash and rigidity requirements as well as larger vehicle dimensions – demonstrates that this can be done successfully. The attained weight reductions in the body structure are based on systematic application of the following strategies:

#### **Body-in-white – how savings add up to 23 kg**

- 12 kg – Use of high-strength and advanced high-strength steel grades and reduction of sheet metal thickness
- 4 kg – Only using materials where they are needed
- 7 kg – Optimising profile and surface geometries

**High-strength and advanced high-strength steel grades.** The share of high-strength steels has grown from 66 per cent to 80 per cent compared to the Golf VI. The decisive advantage lies in the fact that Volkswagen has built up extensive know-how in the development and production of ultra-high-strength, hot-formed parts since the Golf VI and has invested in manufacturing facilities – more than any other carmaker in the world. The share of these parts that are up to six times as strong as conventional steel parts has grown from six per cent in the Golf VI to 28 per cent in the new Golf. Moreover, new advanced high-strength steels are available on the market today that did not exist when the previous model was being developed. These represent another nine per cent in the new Golf. The advantage

# TAILORED BLANKS



of these extremely strong steels? The finished parts made of them can be designed to be considerably thinner than before and still handle the stresses of a crash. Nearly the entire safety architecture of the new Golf consists of these steels, which effectively form the vehicle's backbone. And yet hot-forming also saves a total of 12 kg in weight.

**Only using material where it is needed.** The second lightweight design strategy – to only use material where it is needed – is an obvious one. Yet, it has been perfected in the new Golf. This effort even goes so far as to precisely vary the sheet metal thicknesses within a part; this is done at the rolling mill of the steel supplier, which delivers a tailor rolled blank (a rolled blank with variable thickness) to the hot-forming facility. One advantage compared to conventional tailored blanks is that eleven zones can be produced within a cross-member, each with optimal sheet thickness. The transitions between the different sheet thicknesses here are uniform and exhibit no abrupt changes in strength. The savings for just these parts: -4 kg.

**Optimising geometries.** Geometries of the load-bearing structure and surface parts have been optimised for many years. Continually improved virtual methods in the development process can be used to utilise existing installation spaces even more effectively. Take the example of the longitudinal frame member. By optimal utilisation of the mounting space between the engine and the front of the chassis, the profile cross-section could be increased by 25 per cent, permitting a thinner sheet. Nonetheless, the entire front structure of the new Golf can absorb more energy in a frontal crash – thanks to geometry that is computationally optimised by FEM. In the case of surface parts such as the bulkhead and the floor, computationally optimised, acoustically effective corrugation patterns were introduced that also make the sheet metal more rigid and in turn lead to a reduction in

sound insulating measures. Just these mentioned examples result in a weight reduction of seven kg.

**New production methods.** Welding processes and innovative tools also make a decisive contribution towards attaining high quality in body manufacturing. They are used to join and assemble all components – including the hot-formed steels and tailor rolled blanks. Some of them are making their debut in the new Golf. They include the laser clamp welder. This tool enables what are referred to as wobble welds, which are able to produce the joint between parts on a short flange. The ‘wobble’ describes the sinusoidal path of the laser weld seam.

**Hot forming.** Hot-formed parts have an extremely high tensile yield strength of 1,000 MPa (Megapascal), which is six times as high as for deep-drawn steels and up to four times as high as for conventional high-strength steels. In the hot-forming process, a red-hot blank, heated to approximately 950 degrees Celsius, is inserted in the forming tool and is formed in a work process and then quickly cooled in the tool. Excellent material properties are realised here.

implement.

**Think  
Blue.**

**Think Blue.  
Factory.**

### **Sustainable production – Think Blue. Factory.**

To build efficient vehicles is one objective of the automotive world. Another is to produce them under sustainable conditions in factories that are also efficient. For years, Volkswagen has been investing in clean, environmentally friendly production. Large shares of the energy required to produce vehicles are already obtained from renewable energy sources such as wind power. A key concept at Volkswagen is embodied in the motto “Think Blue.” – an initiative for working with energy sparingly. This concept extends from the interactive “Think Blue. Trainer” (fuel-saving app) to “BlueMotion Technologies” (stop/start system, etc.) and up to the factories.

**Think Blue.** With “Think Blue. Factory.” Volkswagen is transferring the concept of “Think Blue.” to production – a comprehensive and interdepartmental initiative for all Volkswagen plants across the globe. “Think Blue. Factory.” bundles all actions to improve resource efficiency and reduce emissions. Energy, materials and water are used more efficiently, and emissions are reduced. Volkswagen is targeting an additional 25 per cent improvement in production processes at all of its plants by 2018 to make them more environmentally friendly. “Think Blue. Factory.” is based on four areas of action:

**1. Society.** To fulfil the expectations of customers, investors and partners is very important to Volkswagen. To attain leadership here, the sustainability of production is measured by five key environmental indicators: energy use, water consumption, amount of waste material, CO<sub>2</sub> emissions and solvent emissions. It is easier to derive binding improvement targets based on these indicators.

**2. Efficiency.** The focus here is on processes in factories. A good example is the paint shop at the US plant in Chattanooga: the dry paint separation process implemented there saves about 75,000 litres of water daily compared to conventional processes. Another example comes from the German plant in Chemnitz. The engine plant there has bundled many actions for conserving resources. The plant was able to reduce specific energy consumption by 17 per cent and fresh water consumption by 86 per cent. In the context of such efficiency increases, “Think Blue. Factory.” has defined the vision of a factory in which all processes are designed to be exceptionally eco-friendly. New factories will be based on this model. In addition, processes will be developed that make all existing Volkswagen plants more eco-friendly by 2018.

**3. Energy resources.** The Group-owned Volkswagen Kraftwerk GmbH is already managing the reduction of CO<sub>2</sub> emissions in energy generation and distribution. A significant component in reducing emissions is diversification of the energy generating infrastructure. One area that Volkswagen is promoting is the switch from coal to natural gas, and the company is involved in projects for obtaining energy from renewable energy sources. Take the example of the Wolfsburg plant – the main plant of Volkswagen and the primary production site for the Golf: significant energy savings and utilisation of renewable energy are being successfully employed here – e.g. energy obtained by photovoltaic surfaces on the building roof as well as integration of energy-optimised heat pumps.

**4. Employees.** As part of the concept of “Think Blue. Factory.” all employees are sensitised to the need for awareness of how they work with resources and for environmentally-friendly behaviour in production.

# XDS



## **New Golf is first Volkswagen with multicollision brake**

Standard multicollision brake reduces severity of secondary collisions

New Golf debuts with PreCrash system and progressive steering

# ACC

**Wolfsburg, August 2012.** The new Golf is the first car of the compact class in which – despite its reduced weight of up to 100 kg – significant gains have been made in comfort and safety. At the same time, an armada of new technologies substantiates the innovative power of the brand in the compact class. In the Golf, these technologies are more attainable than ever before for more people.

### New systems – optimised safety and convenience

New assistance systems include the multicollision brake – the Volkswagen Group is the only carmaker in the world to implement such a system – a proactive occupant protection system, standard XDS electronic differential lock (as found in the previous-generation Golf GTI), ACC adaptive cruise control plus Front Assist and a City Emergency Braking function, Lane Assist lane-keeping assistant, fatigue detection, traffic sign detection and the latest generation of the automatic parking assistant Park Assist including OPS (360 degree display) as well as the automated light functions Light Assist and Dynamic Light Assist. There are other new technologies as well, such as progressive steering (optimised dynamic performance and better comfort), selection of the driving profile with up to five modes (“Eco”, “Sport”, “Normal”, “Individual” and “Comfort”), an electronic parking brake, a newly developed ergonomic sport seat (ergoActive seat), a guard against using the wrong fuel in the diesels, a new climate comfort windshield that is also a first in this segment and a new generation of information and entertainment systems.

### Assistance systems – automatic protection

**Multicollision brake.** An innovative new feature is the Golf’s multicollision brake, which has already won a safety innovation award from Germany’s largest automobile club (ADAC). Studies in accident research have found that approximately one-fourth of all traffic

accidents with personal injury are multiple-collision accidents – what is meant here is that there is a second impact after the initial collision.

The multicollision brake automatically brakes the vehicle when it is involved in an accident to significantly reduce its residual kinetic energy. Triggering of the multicollision brake is based on detection of a primary collision by the airbag sensors. The system evaluates information from accelerometers in the vehicle, as well as information from pressure sensors in the doors, which detect any side intrusions. Vehicle braking by the multicollision brake is limited by the ESC control unit to a maximum deceleration rate of 0.6 g. This value is the same as the deceleration level of Front Assist; this also means that driver control of the car is assured when automatic braking is initiated.

**Proactive occupant protection (PreCrash).** Proactive occupant protection is a typical example of a technology that is being transferred from the luxury class to the compact class. Volkswagen first implemented the proactive occupant protection system in the Touareg. Now the system is making its debut in the Golf, making it one of the few vehicles in its class worldwide to offer such a protection system.

If the proactive occupant protection system detects a potential accident situation – such as by the initiation of hard braking via an activated brake assistant – the seatbelts of the driver and front passenger are automatically pretensioned to ensure the best possible protection by the airbag and belt system. When a highly critical and unstable driving situation is detected – such as severe oversteer or understeer with ESC intervention – the side windows and sunroof are closed until there is just a small opening. The reason: when the windows and roof are nearly closed the head and side airbags offer optimal support and thereby achieve their best possible effectiveness.

**Adaptive cruise control.** Until now, adaptive cruise control (ACC) was reserved for vehicles in higher segments such as the Volkswagen CC or Phaeton. Now ACC has arrived in the compact class with the Golf. ACC maintains a preselected speed and a defined safe distance and automatically brakes or accelerates in flowing traffic. The system dynamics can be individually varied by selecting one of the driving modes that are optional for the new Golf. With a manual gearbox, ACC operates over a speed range from 30 to 150 km/h. Via the DSG dual-clutch gearbox, Adaptive Cruise Control can even brake the Golf to a standstill depending on the situation, and it operates fully automatically even in stop-and-go situations.

**Front Assist.** Front Assist works with the ACC radar sensors integrated at the front end; they are used to measure the distance to traffic ahead. The system continually monitors this distance and warns the driver of any front-end collision that is imminent if no action is taken; it does this by applying a noticeable brake pressure, even if ACC is deactivated. Front Assist brakes automatically if necessary. One component of Front Assist is the new City Emergency Braking function.

**City emergency braking function.** The City Emergency Braking function is available for the first time in the Golf; it is a system extension of ACC. The City Emergency Braking function automatically initiates braking at speeds below 30 km/h to avoid an imminent frontal collision. The system scans the space in front of the Golf using a laser sensor and assesses the risk of an impending collision. If this collision with an object moving in the driving direction or a stationary object is imminent without any reaction from the driver, then the brake system is pre-conditioned, and (in a second stage) the hydraulic brake assistant is switched to a more sensitive mode. Depending on the situation, City Emergency Braking

might then initiate, as a third stage, automatic hard braking to a stop, or alternatively support the driver with full braking power if the driver is braking insufficiently.

**Fatigue detection.** This system, which was first introduced in the current Passat, detects waning driver concentration and warns the driver with an acoustic signal lasting five seconds. A visual message also appears in the instrument cluster recommending a break from driving. If the driver does not take a break within the next 15 minutes, the warning is repeated once. At the beginning of each car trip, the system analyses the driver's characteristic steering behaviour. Once under way, the fatigue detection system continually evaluates signals such as steering angle. If monitored parameters indicate a deviation from the steering behaviour recorded at the beginning of the trip, then visual and acoustic warnings are produced. Independent of this monitoring, whenever the system is activated it recommends a driving break to the driver after four hours of continuous driving.

**Lane Assist.** In the Golf, this camera-based lane-keeping assistant with steering intervention operates with extended functionality: centre tracking. If desired, the system – appearing for the first time in the Golf – can now also maintain continuous tracking support, which optimises comfort and convenience. On its safety functionality: as soon as it becomes evident that the driver is leaving the driving lane or is driving over the lane markings without setting the direction indicator, Lane Assist warns the driver by vibrations in the steering wheel and countersteers.

#### **Convenience systems – steering, braking, seeing**

**Progressive steering.** Conventional steering systems operate with a constant gear ratio. However, the new optional steering system in the Golf operates with a progressive gear ratio, which always represents a compromise between dynamic performance and comfort.

This noticeably reduces steering work in manoeuvring and parking. On country roads with lots of bends and in turning, meanwhile, the driver will notice a gain in dynamic performance due to the more direct gearing; the driver also does not need to turn the wheel as much.

Variable ratios have long been known in the area of hydraulic steering systems; however, the tuning of such a steering system is subject to very tight limits, so that the driver is not overtaxed by the transitional behaviour. This is completely different with the new progressive steering system; the combination of the progressive steering ratio of the steering rack and the tuning potentials of an electro-mechanical steering system are systematically exploited in the Golf to realise optimised steering behaviour that is sporty yet practical in everyday driving.

**Electric parking brake.** For drivers of larger Volkswagen cars such as the Passat or Tiguan, the electric parking brake is already taken for granted. Now, this handbrake is also making its way into the Golf. Instead of a handbrake lever, there is a main control switch plus an Auto Hold switch on the centre console. The electric parking brake offers numerous advantages: eliminating the conventional hand brake frees more space on the centre console; in addition, the brake is automatically released when driving off, making it simpler when driving up a hill. Last but not least, the Auto Hold function prevents unintentional rolling from a stop.

**Dynamic Light Assist.** Via a camera on the windscreen, the traffic ahead and oncoming traffic are analysed. Based on this data, the system assists by activating the main beam at speeds over 65 km/h and keeping it active. Here is how dynamic light assist works: the main beam modules of the xenon headlights with dynamic cornering lights are individually

dipped only in those areas in which the system has analysed potential glare to other vehicles in traffic. This function is technically implemented by a swivelling masking aperture between the reflector with the xenon filament and the lens. Along with lateral swivelling of the entire module and independent control of the left and right headlights, this additional aperture geometry is able to mask the light source and thereby avoid glare to traffic ahead and oncoming traffic.

**Light Assist.** For models with standard headlights, the base version of the automatic main beam assistant is available. Light Assist analyses traffic ahead and oncoming traffic – via a camera in the base of the rear-view mirror – and assists to control activation and deactivation of the main beam (from 65 km/h).





**XDS  
ACC  
Side Assist  
Lane Assist  
Park Assist**

# Pre Crash

+ 30 |



## **New Golf offers noticeably more space and comfort**

Well thought-out package enlarges boot space to 380 litres

First Volkswagen with inductive antenna interface for smart phones



**Wolfsburg, August 2012.** At a length of 4,255 mm, the new Golf is now 56 mm longer than the previous model; similarly, its wheelbase has grown by 59 mm to 2,637 mm. Since the front wheels are also located 43 mm further forward, the interplay of the new dimensions creates sportier proportions, an improved crash structure and an optimised interior space concept. At the same time, the body was lowered in height by 28 mm (1,452 mm) – but headroom in the interior is still very good. On the exterior, the lower height has improved the car's aerodynamic performance. Its frontal area is 0.03 m<sup>2</sup> smaller, and its air drag coefficient ( $c_d \times A$ ) has been reduced by 10 per cent. As a result, the Golf BlueMotion attains a  $c_d$  value of 0.27, making it one of the best in its class. Nonetheless, at 1,799 mm the new Golf has been designed to be 13 mm wider. In parallel, the track widths have been increased by 8 mm in front and 6 mm at the rear. These additional millimetres give the Volkswagen a fuller stance on the road.

#### **Space concept – more space over its length**

The slight increases in length and width, as well as the increased wheelbase and optimised track widths, have a perceptible effect on space in the interior, which is now 14 mm longer (1,750 mm). Passengers in the rear seating area, in particular, can now enjoy 15 mm more knee room. Shoulder room has grown by 31 mm to 1,420 mm. Elbow room is increased by 22 mm to 1,469 mm. In the rear seating area, shoulder room has also been optimised with a 30 mm gain and elbow room increased by 20 mm.

The Golf Trendline and the mid-level Comfortline equipment line can be ordered with a front passenger backrest that folds completely forward. In addition, the 60:40 split backrest that is standard in all versions of the new Golf can be folded down. When folded, a nearly level cargo floor is created with a length of 1,558 mm; the maximum cargo space length with

the front passenger backrest folded is 2,412 mm. From the Comfortline, the Golf can also be equipped with a cargo opening at the middle of the rear backrest.

The space concept of the new Golf also exhibits numerous other improvements. Cargo capacity, for example, has grown by 30 litres to 380 litres; the variable cargo floor can also be lowered by 100 mm. Perfection in the details: the load sill to the bootspace is now just 685 mm (-17 mm) high – the best value in its market segment. In parallel, the bootspace width has grown by 228 mm to 1,272 mm. Volkswagen has also increased the width of the bootspace opening by 47 mm to 1,023 mm.

#### **Styling and controls – sophisticated, intuitive**

Ever since the first generation of 1974, the Golf has been characterised by an interior that does not impress with gimmicky elements, but instead with its clarity and optimal user operability. The team led by Volkswagen head designer Klaus Bischoff has further developed this clarity and precision in the new Golf, improved details of its ergonomics and controls and in the process conceptualised a timeless and contemporary interior design that has been crystallised from its functionalities. The sporty, driver-oriented architecture of the dashboard is perfectly integrated in the demographically conceptualised interior.

Significantly more space and further improved ergonomics typify the driver's working space. Very tall persons behind the wheel will welcome the seat position that has been shifted back by 20 mm; the steering wheel's adjustment range has also been modified. Pedal distances were also optimised thanks to the modular transverse matrix; the space between the brake and accelerator pedals, for example, has increased by 16 mm. Another ergonomic improvement: compared to the previous model, Volkswagen has raised the position of the gearbox controls by 20 mm; the gear shift grip now rests better in the hand.



In general, all interior elements were redeveloped and redesigned. A conspicuous feature is the wide centre console that is oriented towards the driver, which is more typical of the luxury class than the compact class. Never before have the traditionally high levels of objectivity and functionality in the Golf been implemented with such elegance and sophistication. At the middle of the centre console, beneath the hazard flasher switch, is the five- to eight-inch infotainment touchscreen with its menu keys and dials. All infotainment systems have been completely redeveloped and redesigned. For the first time, Volkswagen is introducing a generation of touchscreens with a proximity sensor and a function that reacts to wiping movements by the fingers (wiping and zooming gestures like those of a smart phone); the graphic design of the interface also reflects the new era of intuitive control.

Located beneath the infotainment module are the well laid-out controls for climate control. This is followed by the lower section of the centre console that runs in a line up to the large centre armrest. The consistent design conveys a sense of the sophistication of a luxury class model. To the right of the driver are the buttons for the new electronic parking brake and its Auto Hold function. Integrated in front of it is a storage compartment in which the multimedia interfaces (aux-in, USB and Apple) have been integrated. The compartment is also big enough to hold a smart phone.

There is a large storage compartment hidden under the centre armrest that can be adjusted up to 100 mm in length and five stages in height. This compartment also holds a lot: optional features housed here are elements of the hands-free telephone system and a second fully featured USB interface that can be used for data transfer and charging.

For the first time in a Volkswagen, there is also an inductive exterior antenna connection. The cell phone is placed in a universal holder on the centre armrest where the cell phone antenna inductively “couples” and connects to the vehicle’s external antenna. It offers the same advantages as those of a stationary telephone system:

- Better reception and signal strength because an external antenna is used.
- Less drain on the cell phone battery. By coupling to an external antenna, the cell phone only needs minimal power to send and receive
- Minimal radiation in the passenger compartment.

Visually distinctive in the interior – along with the centre console – is what the designers refer to as the “dashboard body”, the upper section of the dashboard that is upholstered with a plastic material that is visually elegant and pleasing to the touch. It is subdivided towards the windscreen by a sculptural line that runs across the entire interior width. Each of the outer areas of the dashboard body form a uniform connection to the left and right to the window sills. Like the lower area of the dashboard, the lower door trim can also be ordered in a contrasting colour. Sophisticated: the inlays in the door panels can be trimmed with an optional light gap as ambience lighting. The electric window switches are ergonomically easy to access in the armrests; located in front of the door handle on the driver’s side is the control for electric mirror adjustment. The door trim panels themselves display the motif of two intersecting curved lines, which logically partition the function areas of the door trim: arm rest, door handle, storage bin and loudspeaker. Optional ambience lighting provides for optimal illumination and an elegant atmosphere at night. The new white illumination of buttons and other controls highlight its luxury class feeling.

### **Seating comfort – ergonomics like in the luxury class**

The seats of the Golf are exceptionally comfortable: well-shaped body contours, optimal support in dynamic driving, and a high level of comfort on long trips. These characteristics were achieved by designing the foam contours to properly fit body forms and by optimised springing and damping properties of the cold foam cushioning sections. The two higher equipment versions, the Comfortline and Highline, are equipped with standard two-way lumbar support for the driver and front passenger. Even greater individual adjustment, and in this case electric, is offered with the optional 12-way electric front seats.

Another new development making its debut in the Golf is the ergoActive seat with extended adjustments for the driver. Along with the familiar seat height adjustment and seat heating, new features to this vehicle class are adjustment options for seat depth, seat angle and an electric four-way lumbar support plus massage function. The ergoActive seat also offers exceptionally good ergonomic properties, which have already earned it the official AGR seal (“Healthy Backs” campaign) in Germany.

# SENSOR

## **First Volkswagen touchscreen with proximity sensor**

Display automatically switches to operating mode as hand approaches

Three display sizes (5, 5.8, 8-inch); includes nav updates for three years



**Wolfsburg, August 2012.** Volkswagen is equipping the Golf with a new generation of radio and radio-navigation systems with completely new designs. All systems have a touchscreen as standard. The new device generation is available in six extension levels and in three different display sizes: 5-inch, 5.8-inch and 8-inch. For the first time, Volkswagen is implementing displays that have proximity sensors (from 5.8 inch display size): as soon as a finger of the driver or front passenger approaches the touchscreen, the system automatically switches from display mode to operating mode. The display mode shows a screen that is reduced to just the essentials. In the operating mode, on the other hand, the elements that can be activated by touch are specially highlighted to simplify intuitive operation. In addition, the displays have a function in which wiping gestures can be used to scroll or to page through virtual CD covers of the media centre.

In designing the new generation of devices, Volkswagen's primary goal was to integrate the most advanced infotainment applications into the Golf, which should be consistently easy to use – despite all of the complexity of today's systems – i.e. absolutely intuitive and therefore safe during driving.

#### **Basic touchscreen – trip computer and interfaces**

**Standard display (5-inch).** The standard unit in the new Golf is a 5-inch black-and-white display (resolution: 400 x 240 pixels). The functional scope of the production module includes trip computer information (average fuel economy, etc.), clock time and date, service menu (oil level, etc.), vehicle settings (e.g. winter tyre warning), adjustment of instrument lighting, language setting, climate control menu, Eco-HMI displays (information on power consumers and tips on an especially economical style of driving) and – depending on vehicle features – steering wheel heating, the visual display for the ParkPilot and driving profile selection.

### Radio systems – from 5.8-inch with proximity sensor

**“Composition Touch” radio (5-inch).** The next extension stage is standard in certain countries (e.g. Germany) from the Comfortline and is otherwise available as an option. There are three buttons to the left and right of the touchscreen that are used to activate the menus or functions “Radio”, “Media”, “Car”, “Setup”, “Sound” and “Mute”. In this case, the device also contains an FM/AM radio, loudspeakers (front), an interface for SD cards and an aux-in port.

**“Composition Colour” radio (5-inch).** Similar to the Composition Touch in terms of its device layout, but the Composition Colour is also equipped with such features as a colour display, FM/AM radio as well as front and rear loudspeakers and a CD drive (MP3 capable).

**“Composition Media” radio (5.8-inch).** Equipped to offer even more extensive features is the Composition Media radio. Its capacitive colour display is 5.8 inches in size, and it is coupled with a proximity sensor that is integrated across the area beneath the display. The display also responds to wiping and zooming gestures such as those used on modern smart phones. There are now also four buttons to the left and right of the touchscreen; in contrast to the 5-inch systems they also enable access – depending on vehicle features – to the menu levels “Phone” and “Voice” (voice control). The Composition Media radio is equipped with these features in addition to those of the Composition Colour radio: an optional telephone preparation (Bluetooth) and a USB interface (iPod/iPhone compatible). The USB and aux-in interfaces, meanwhile, are integrated in a separate compartment on the centre console in front of the gear shifter; this compartment also offers storage space for a smart phone.



**Radio-navigation systems – includes map data updates**

**“Discover Media” navigation function (5.8-inch).** The Composition Media radio can be supplemented by a navigation module (Discover Media). The features and functions are identical except for the navigation system that is integrated here with European map data and associated second SD card slot; the navigation computer is located in the glovebox together with the CD player and SD card slot. Updates of the navigation maps are included in the price for all units with a navigation module for a period of three years.

**“Discover Pro” radio-navigation system (8-inch).** The top radio-navigation system with a large 8-inch capacitive touchscreen is known as the Discover Pro. Features installed here – beyond those of the Discover Media – are a DVD drive instead of CD drive (audio and video), a UMTS telephone module, extended premium voice control (base version is available as option for Composition Media and Discover Media) and a 64-GB SSD hard drive (of which 10 GB is available for individual use). Integration of the Compact Disc Database from Gracenote also enables state-of-the-art playback and management of media. In addition, the Discover Pro also operates as a WLAN hotspot to enable Internet access for a WLAN-capable mobile device (smart phone or tablet).













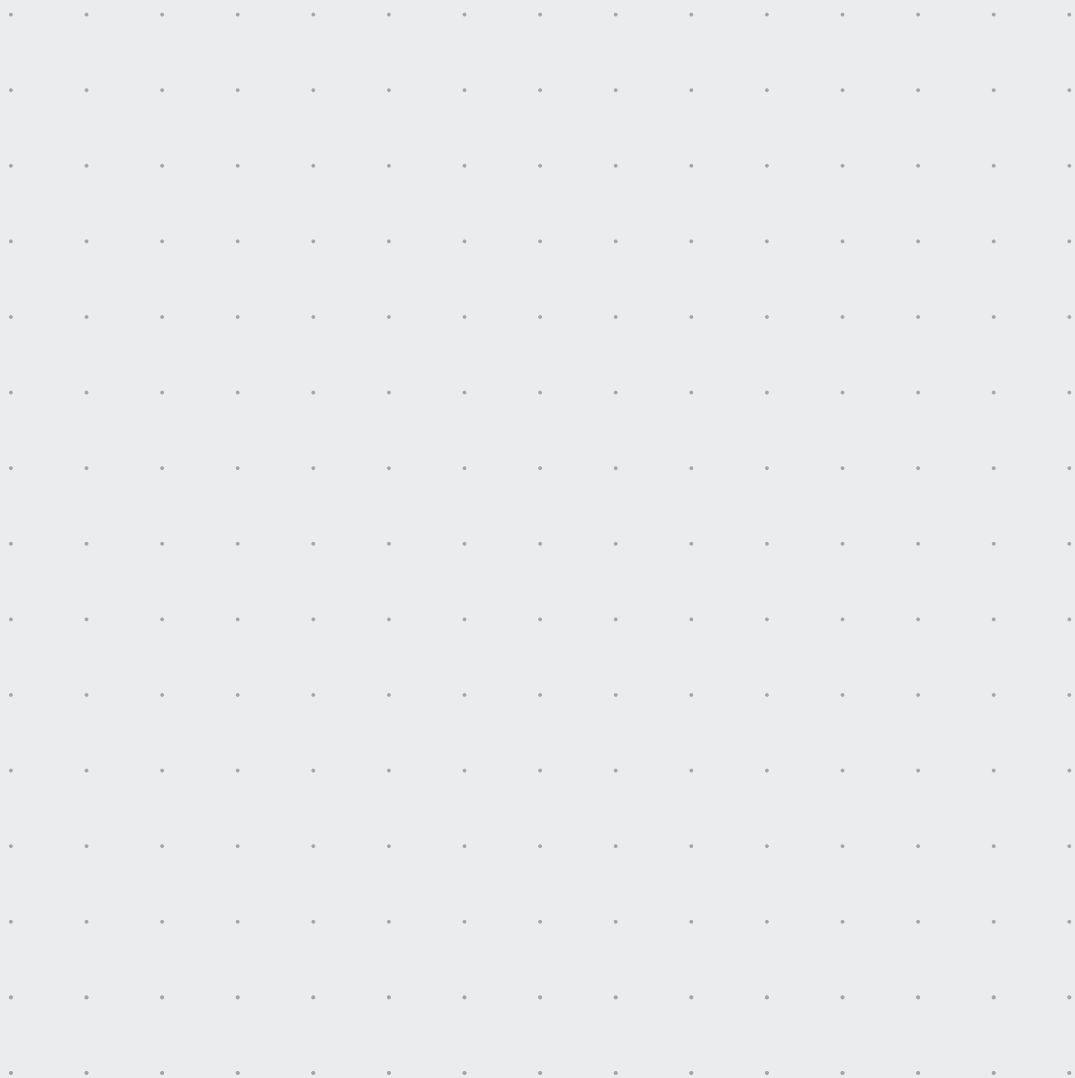


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# Golf



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**Perfection in the details.**

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