R&D STORY

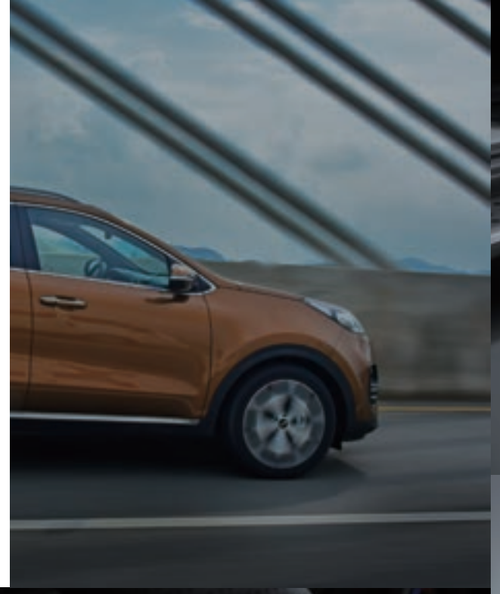
THE SUV
SPORTAGE

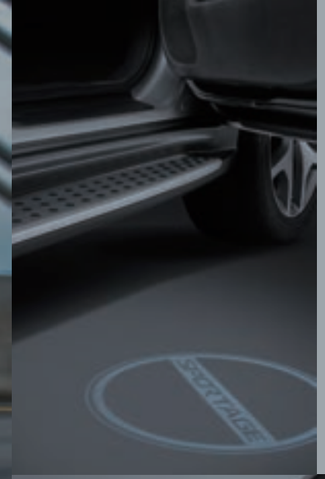
DESIGN & PACKAGE | PERFORMANCE | DRIVING EMOTION | CONVENIENCE

HYUNDAI
MOTOR GROUP

HYUNDAI MOTOR GROUP R&D DIVISION

THE SUV
SPORTAGE





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A REVOLUTION IN THE SUV MARKET

The popularity of SUVs continues to soar. Sales of SUVs have shown a marked increase since 2009 and now trail sedan sales by only a small margin. If this trend continues, the number of SUVs sold is likely to surpass the number of sedans sold in the near future. The fourth generation Sportage, the latest Kia Motors' popular compact SUV, is built to accelerate this takeover of the SUV. Here is a review of the market situation and an overview of Sportage's future.

STEADY GROWTH OF THE SUV MARKET

The SUV market is growing in all regions of the world from North America, where the SUV market was first established, to emerging economies such as Brazil, Russia, India and China. According to a statistics report from the Korea Automobile Manufacturers Association (KAMA), SUVs market share steadily increased from 12.6% in 2012 to 17% in 2014. Since 2009, the annual growth rate of SUV sales has averaged at 4.9%, which is remarkably higher than -1% annual growth rate of sedan market during the same period. The South Korean SUV market is expecting strong growth especially in the latter half of 2015, with the release of the all new Tucson by Hyundai Motor and Santa Fe the Prime. Global automakers are also releasing new SUV models with improved engines. According to KAMA statistics, new vehicle sales totaled 136,192 units in July, which was a 6.3% increase compared to the same period last year. Accumulated sales between January and July was 873,530 units which was a 3.9% increase compared to 2014. Analysis suggests that strong SUV sales were the main driver for this growth. Sales in July of Kia Motors models increased by 13.9% to 48,202 units thanks to strong sales of the new K5 and the new Sorento. In fact, sales in July set a new monthly sales record for Kia Motors in South Korea.

RESPONDING TO CHANGING CUSTOMER NEEDS

The growth of the SUV market is closely associated with customers changing lifestyles. In particular, the increasing number of people who participate in outdoor activities which require a vehicle that can handle rough roads while still serving as a sensible mode of transport in the city. According to a Korean national statistics report, the number of people who participate in camping activities has sharply increased from 0.6 million in 2009 to three million in 2014. The release of new urban SUV models with a more affordable price tag has also made SUVs more accessible to a greater number of people. Furthermore, many female drivers are taking interest in new urban SUVs. Urban SUVs are great as family cars thanks to their ample interior space which can easily accommodate a range of equipment from baby carriages to children's bikes. The compact size of urban SUVs also makes them more approachable. Departure from the traditional rugged styling and great driver visibility, which makes driving and parking easier, are making them ever more popular.

TAKING THE BEST FROM A SEDAN INTO AN SUV

The evolution of SUVs is yet another reason for the soaring popularity of SUVs. For example, the latest urban SUVs employ sleek design and advanced convenience features while boasting great fuel efficiency and ride quality. In the past, SUV buyers had to compromise on ride quality and fuel efficiency in excha nge for more interior space and off-road drivability. However, the latest urban SUVs boast vastly improved ride quality with far less vibration and noise, on a par with popular sedans. Moreover, urban SUVs still come with dynamic performance characteristics, which makes them appealing to sophisticated car buyers. Although the use of an efficient diesel engine is key to achieving high fuel efficiency, lightweight design contributes to fuel efficiency improvement regardless of engine choice. The new Sportage was created to meet changing customer needs and is ready to take over the market.

SPORTAGE: A NEW CHAPTER IN THE HISTORY OF THE URBAN SUV

In 1993, Sportage debuted as the first urban SUV. More than two decades later, Sportage stands strong as one of the most popular models in this market segment. The all new fourth generation Sportage is about to open a brand new chapter in the history of the urban SUV, with innovative new features and many improvements.

Beginning a new chapter

It may be counter to common sense, but it is often much more difficult to reinvent a successful model than to create a new model. This explains why the development team for the fourth generation Sportage struggled so much. Ever since it was created in 1993 by Kia Motors, the Sportage has been a best-selling SUV. It was, in fact the first urban SUV, which marked the beginning of an exciting new market segment. The third generation Sportage R was especially successful, particularly in Europe where it was the fourth most popular model in the segment. The success of the third generation Sportage R meant that the fourth generation model needed to improve on an already highly refined model. Expectations were high to say the least.

Development of the fourth generation Sportage began with an in-depth analysis of all the major markets and relevant market trends. After the development process had begun, we also held intensive development objective sessions in order to create detailed implementation plans. The goal was to develop an exceptionally high quality product with the most reasonable price tag. The team worked tirelessly and created the best Sportage ever.

Building on strength

Design has always been a top strength of the Sportage. The third generation Sportage R was particularly recognized for its great design with awards such as the 'iF Design Award' and 'Good Design Award'. This made design one of the most challenging areas in the development of the new Sportage. As always, the keywords for design of the new Sportage were sportiness and dynamism. The designers tried to express these keywords in the most up-to-date manner and came up with a great design which received rave reviews.

Ease of use was the next area of focus for development. The team began by conducting internal and independent assessments of where the third generation Sportage R fell short. The assessment was conducted with a strong focus on visibility and dead space. Visibility was chosen because the third generation Sportage R was criticized for its low driver visibility. However, there was a dilemma for designers because driver visibility could only be improved by making significant changes to the highly praised dynamic profile of the third generation Sportage R. The same was true for dead space. Some dead space existed in the third generation Sportage R despite the best efforts from the engineering team. This meant the development team of the fourth generation team had to review every detail of the new Sportage and apply their best ideas to reduce the dead space.

Convenience features were also reviewed for possible improvements. For example, a wireless smartphone charger was installed in order to allow people without a charging cable to recharge their phone. The decision was made to introduce advanced features such as Autonomous Emergency Braking (AEB), a Lane Departure Warning System (LDWS), Blind Spot Detection (BSD) and Advanced Airbags, in order to ensure that the new Sportage is one of the most convenient and safest cars in the market.

Challenging the status quo

Interior quality and performance are two areas where the greatest progress was made in the fourth generation Sportage. One of the biggest complaints about the third generation Sportage R was the use of materials that felt and looked cheap. The team worked hard to address this with measures including the use of soft materials on the upper part of the crash pad, high gloss materials on the decorative parts and improved embossed patterns. A push-type lens was fitted in the overhead console and matching light sources for different interior trims.

Last but not least, the final area of improvement was performance. For example, improvements were made to steering and vehicle stability in hard turns at high speed. Steering was also made more responsive in order to make it feel more natural. The improvements were made possible by increasing vehicle body stiffness. In the process, ride quality was also improved. Structural changes were made and new materials were employed in order to reduce noise and vibration.

Performance and ride quality are two qualities which are deemed especially important among European drivers. The fourth generation Sportage was built to out do competitors' models in both these aspects. Sportage is ready to make a splash in the market before 2015 is over.

SPORTAGE:
COMPACT SUV
WITH A GREAT TRACK RECORD

The history of Sportage is almost synonymous with the history of Kia Motors SUV.
Sportage is a pivotal model in Kia Motors SUV line-up and it is ready to stir up the compact SUV market.
Faced with increasing competition, the fourth generation Sportage is ready to enter the market,
challenge its competitors and revolutionize the market.

Jul. 1993 - Sep. 2002

THE FIRST GENERATION NB-7 SPORTAGE

Introducing the first urban SUV

Released on the 9th of July 1993, the first generation Sportage was the first 4WD model by Kia Motors. The Sportage made its world debut at the 1991 Tokyo Motor Show as an 'Urban SUV' along with Sephia. This made Kia Motors the first company to introduce the concept of the urban SUV. Sportage generated strong interest especially in overseas markets, leading to strong sales in overseas markets despite a weak dealer network. Thanks to its great popularity, the Sportage Grand model with a longer body and larger trunk space was added in January 1996. Another variation built on the Sportage Grand model, Sportage Big Van, was released in August 1997.

In 1998, a face-lift model with an improved interior and exterior was released with overall length extended by 80mm. Despite its great success, production of the first generation Sportage ended in September 2002.

Although production of Sportage was discontinued, the first generation Sportage is what made SUVs approachable for drivers.

Aug. 2004 - Mar. 2010

THE SECOND GENERATION KM NEW SPORTAGE

Presenting a new standard of urban SUVs

Sportage returned to the market on the 17th of August 2004. The second generation Sportage was created to appeal to younger drivers who valued great design and affordability. Although the name was the same, the second generation Sportage was built from scratch in order to be true to its name which is a combination of 'Sports' for sportiness and 'Masstige' which means quality goods at an affordable price. The new Sportage was built as a vehicle which is both fun and easy to drive, with the goal of achieving ride comfort and convenience on a par with a typical sedan. In other words, it was built to be more suitable for urban driving rather than off road driving, which is why it was built on a monocoque body.

Targeting a wide range of customers, the new Sportage employed modern styling with an emphasis on sportiness, offering a sophisticated design and a choice of refreshing body colors. It was also the most fuel efficient SUV in South Korea at the time and had the highest NHTSA safety rating. The excellence of the second generation Sportage was widely recognized. For example, Sportage was chosen as the top pick in the 2005 Automotive Performance Execution And Layout (APEAL) study by J.D. Power, one of the most authoritative global market research companies. On the 3rd of January 2006, Sportage VGT equipped with a Euro 4 compliant diesel engine, for stronger performance and fuel efficiency, was released. In October 2007, a face-lift version of the second generation Sportage was released with some minor changes, such as the replacement of the two-tone interior color scheme to a mono-tone scheme. It received another face-lift in May 2009 with a list of new features such as a fuel efficient driving assistance system, a passenger seat airbag, MP3/CD player and AUX & USB ports for the 2010 model.

Mar. 2010 - Jul. 2015

THE THIRD GENERATION SL SPORTAGE R

Establishing a global presence

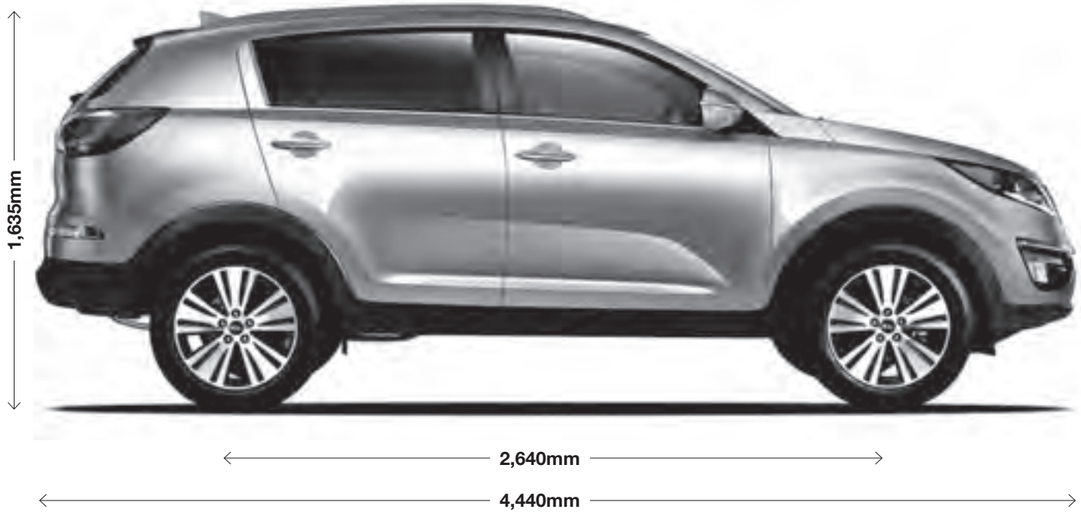
Development of the third generation Sportage began in early 2006 with the goal of creating a truly progressive design for an urban Crossover Utility Vehicle (CUV). Eventually, the development team decided to create a new design based on the 'Kue' concept car, which was highly praised during the 2007 North American Motor Show. Despite a promising start, the development soon came grinding to a halt. Designing a great CUV demanded a low profile and larger interior. However, achieving both was simply impossible considering the conventional door opening structure. In the end, major changes were made including lowering the driver's seat, changing the roof line and fitting a new panoramic sunroof to complete the new design. On the 23rd of March 2010, the third generation Sportage R was released. The sub name R stands for revolution. The first thing which stood out about the third generation Sportage R was its unique sporty design which defied conventional designs. The Kia Motors signature radiator grille and black bezel headlamps made the front design intense and sporty. The R 2.0 diesel engine had a maximum power output of 184ps and maximum torque of 40kgf·m giving the Sportage R great performance while meeting the strict Euro 5 emissions standards. Sportage R was also offered with a Theta II 2.0 gasoline engine with maximum power output and torque at 166ps and 20.1kgf·m, respectively. Sportage R received recognition for its great design and was chosen as winner of the prestigious 'iF Design Award' in Transportation. It was also picked as the winner of the 'Good Design Award', one of the most prestigious awards in the U.S. On the 1st of March 2011, Sportage R received a new engine choice; the Theta 2.0 gasoline turbo GDi engine with maximum power output and torque of 261ps and 37.2kgf·m. The turbo model had a distinctive new exterior and interior design elements such as differently colored indicator panels. On the 20th of July 2012, 2013 Sportage R was released with new features including LED positioning headlamps and a steering wheel alignment indicator.

On the 23rd of July 2013, a significantly upgraded 2014 model was released with a new name 'The New Sportage R'. The name was chosen because the 2014 model had a number of new features including a 4.2-inch color TFT LCD screen, ventilated passenger seat, laminated glass for noise reduction, second row air vents and seatback adjustment controls. The New Sportage R continued to receive minor upgrades as the 2015 model equipped with a Tire Pressure Monitoring System (TPMS) and a stainless steel indicator panel which protects the belt line and transmission.

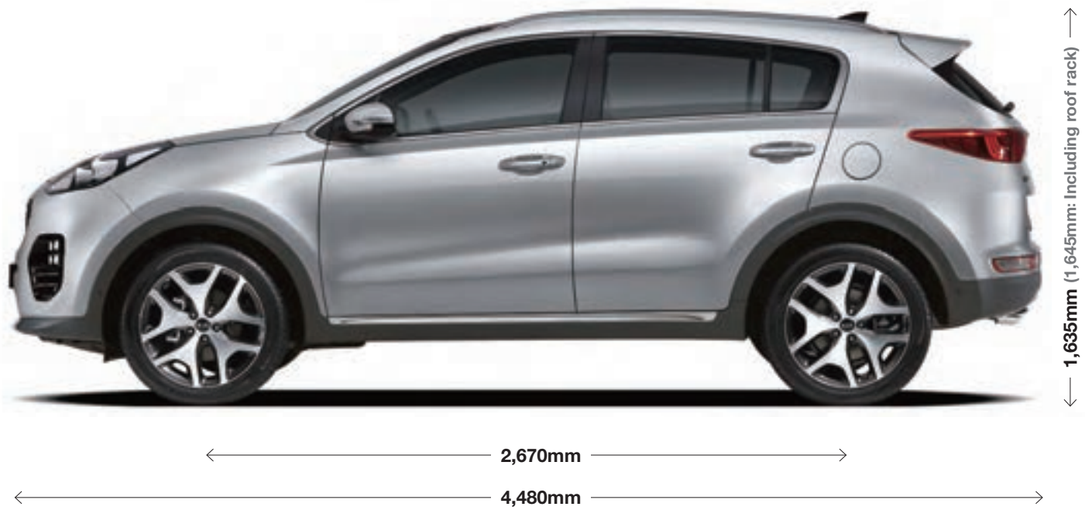
EVOLUTION OF SPORTAGE: IMPROVING ON THE BEST

The fourth generation Sportage takes an urban CUV to the next level, building on the successful formula of its predecessor. The third generation Sportage R was greatly admired when it was first launched in 2010. It was awarded a number of prestigious design awards and maintained its popularity with continuous improvements in both performance and design. The fourth generation Sportage continues this great tradition of innovation.

The Third Generation
SL



The Fourth Generation
QL



Front grille & headlamps
The combination of pointed headlamps and a tiger nose shaped radiator grille below them, creates a unique look.

Rear combination lamps
Smooth and sleek rear design is made complete with rear combination lamps which wraps around the corners for a sophisticated look.

Rear door glass
A subsection of the rear door glass was pushed as far back as possible, while the tailgate glass height was increased by 30mm and the C pillar width shrunk by 62mm for improved rear visibility.


Front grille & headlamps


Rear combination lamps


Rear door glass


Front grille & headlamps


Rear combination lamps


Rear door glass

SL

QL

Increased interior space ❶

The fourth generation Sportage has a roomier interior space thanks to the 30mm longer wheelbase. The fuel tank size was increased by 4 liters from 58 to 62 liters. The luggage capacity was increased from 465 liters to 503 liters.

Vastly improved driver visibility ❷

Thanks to the innovative new design, the pillar blind spot was decreased by 26mm due to reduced pillar thickness and 29mm toward its base. The outside mirror was lowered by 34mm, improving the driver's visibility to the sides. The height of the tailgate glass was increased by 30mm and the width of the C pillar was decreased by 62mm, resulting in vastly improved rear visibility.

Wireless smartphone charger ❸

Thanks to the wireless smartphone charger, it is possible to charge a smartphone in the Sportage by simply placing it on the center fascia.

Comfortable seats for everyone ❹

The driver's seat was designed with an optimal hip point to ensure maximum stability for the driver. The rear seat floor was lowered by 40mm for improved thigh support. The second row seats have reclining functionality for greater comfort. The transmission gear shift and cup position were positioned side by side, which allowed for the extension of the console armrest by 49mm. A tray for small objects was also added.

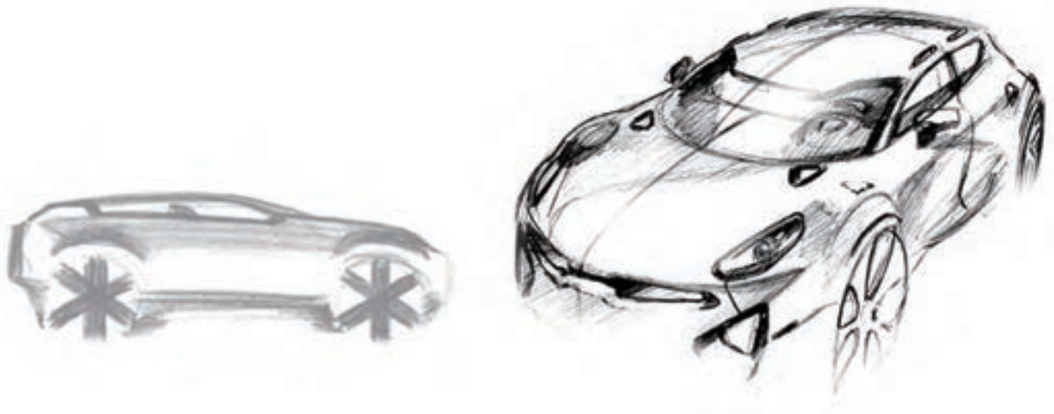
More luggage space ❺

Luggage space was significantly increased thanks to the lowering of the vehicle floor by 47mm. Luggage space can be further increased by 78mm by placing the luggage board on the bottom. The New Sportage is also the first CUV in its class which provides a luggage board storage compartment for versatility.

DESIGN & PACKAGE

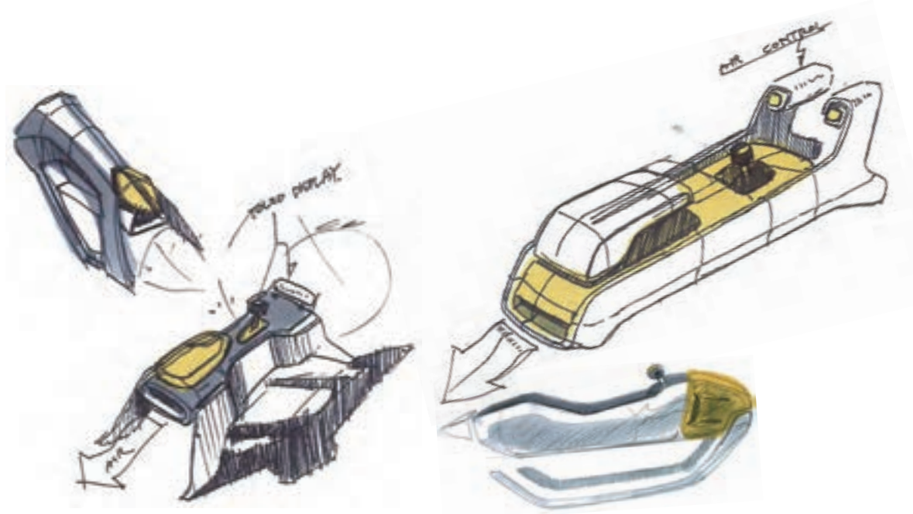
CREATED TO STYLISHLY SATISFY EVERY NEED

The most important thing about an automobile is whether it drives well. Yet, it is often a sleek and sophisticated interior design which makes you fall in love with your vehicle. Experienced drivers understand that visibility, ease of control, seat comfort and luggage space are also important in ensuring satisfaction. This is why the fourth generation Sportage was built with all of these, and more, in mind. It is built to excel in not just quantifiable qualities but to deliver great emotional satisfaction.



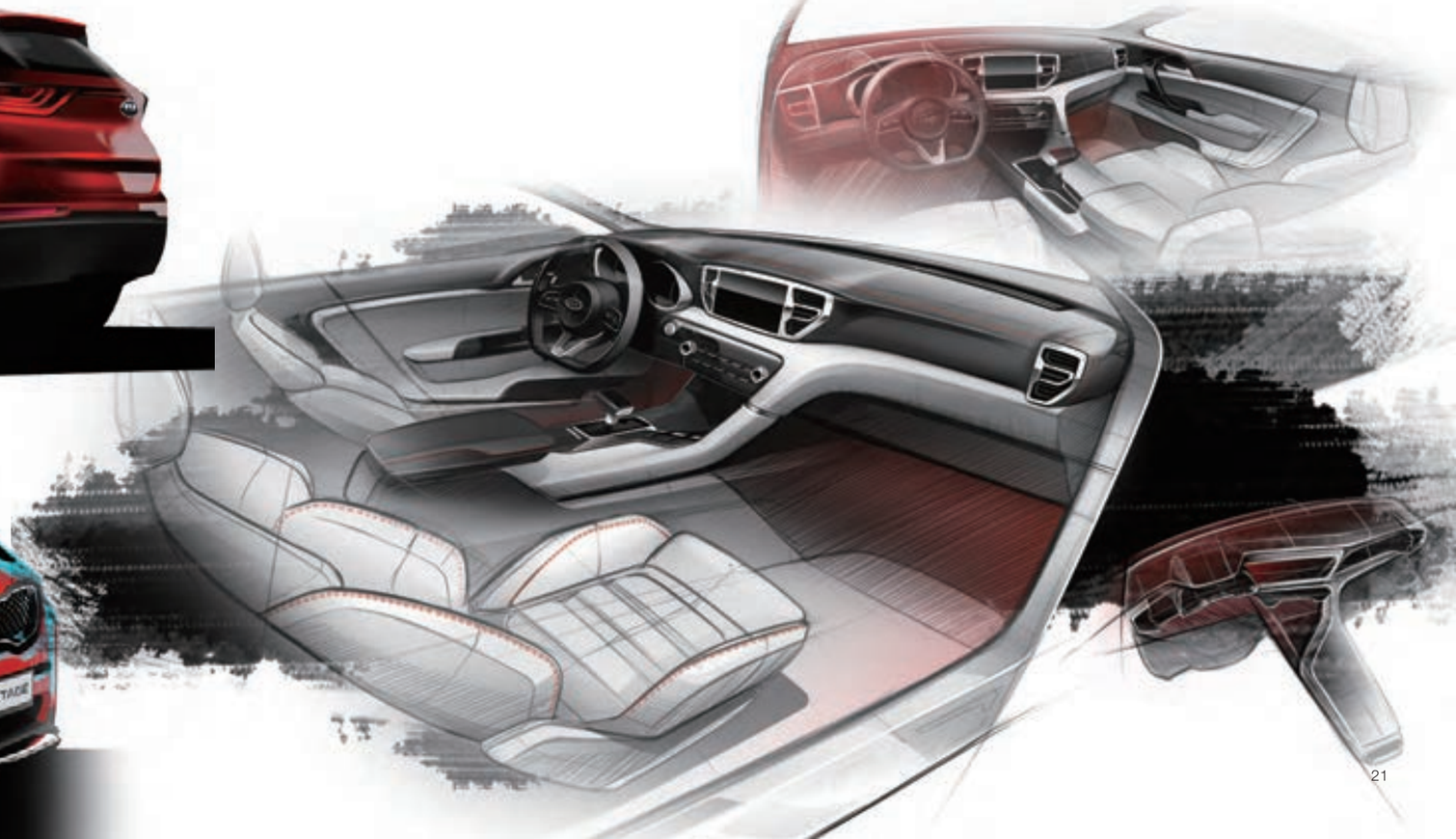
SPORTY & POWERFUL ENERGY

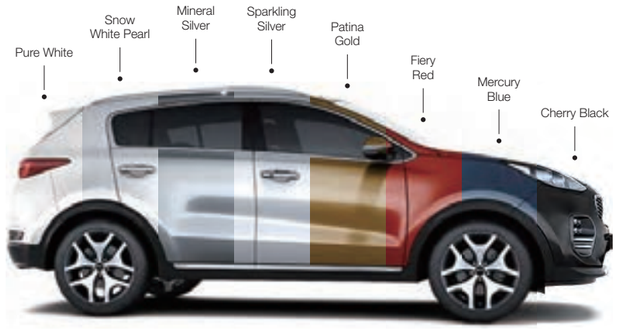
DESIGN EXTERIOR



DRAMATIC SURFACE & DYNAMIC SPORTY

DESIGN INTERIOR





Progressive design building on the Sportage tradition

Designing the fourth generation Sportage was a great challenge because it had to build on the great design heritage of the third generation Sportage R. The designers studied the elements that made the third generation Sportage R wildly popular and refined them further while making the overall design more dynamic. The side design followed the overall profile and shape of the third generation model and made it more voluminous and with a intense side character line, creating a sporty yet sturdy look.

The front design employs a completely new look which radiates with vibrant energy. The front design is quite unique and innovative with headlamps located several inches above the radiator grille. The headlamps and radiator grille had to be repositioned hundreds of times until the final design was agreed upon by all designers. Small details especially the shape of the Daytime Running Lamps (DRL), were changed from square to round and then to honeycomb until the final design were chosen and meticulously refined. Every bit of the fourth generation Sportage design was created thanks to the great team work of everyone involved.

The keyword for the rear design was stability which led to a horizontal layout. The main design elements were created in line with the center garnish and rear combination lamps. The brake lamps were separated and placed above the bumper while the turn signal lamps and fog lamps were placed below the bumper. The rear design also incorporated elements for improving aerodynamics to provide better fuel efficiency, such as the air curtains on the fog lamps molding and the air blade on the rear spoiler.

There were many innovative changes made to the interior design as well. The dynamically shaped crash pad, sleek looking air vents and console fit well in an urban landscape but also look good in an outdoor setting. In addition, the interior was designed for maximum driver convenience. The upper display zone has an Audio, Video, Navigation (AVN) system for driver visibility and buttons were placed on the lower part of the dashboard in order to further enhance the driver's visibility. The control buttons positioned on the lower dashboard are also carefully refined to make them look better while also being easier to use. The display cluster was also meticulously redesigned inch by inch to tackle complaints from third generation Sportage R owners. The AVN screen was specially treated to reduce diffuse reflection and to make it easier to see in daylight. Control buttons were also carefully tilted towards the driver for maximum ease of use.

Sophisticated colors and high quality materials

The fourth generation Sportage comes with exterior color choices which carry a strong sense of sophistication. For example, the five new colors; Snow Pearl White, Sparkling Silver, Patina Gold, Fiery Red and Mercury Blue are all vibrant and each convey a sense of depth when exposed to natural light. The interior comes with three color choices; black one-tone, gray two-tone and canyon beige two-tone. There is also a further option of a brown color pack. A wide variety of materials were used such as plastic, textile and leather. The materials are finished with piping, stitching and punching, further expanding the material variety. Emotional quality was a strong focus for the interior development. Higher quality materials were employed to not only make the interior look better but feel better as well. Once again, meticulous attention was paid to creating the required finish. The process was particularly difficult because there is not a single right answer when it comes to design. Regardless, the design team picked the best results by testing a great variety of materials under different lighting and with a wide range of people. After experimenting with a large number of materials, the designers concluded that attention to detail and achieving harmonization of different materials is the key to achieving a great design. Using a mix of glossy and non-glossy materials for different parts of the inside door handle to minimize scratches was a great example of achieving better design by paying attention to the details. Although glossy materials make scratches look less visible, over using them can make the interior look cheap. The key was to achieve the right mixture of the two types of materials. Some of the parts were also made using different materials for the upper, center and lower zone while ensuring a harmonized look despite the use of multiple materials.

"I participated in Kia Motors design experience program 'Mille Miglia' which involved travelling in a competitor's model for two days. Unlike a short test drive, the program allowed me to closely examine the vehicle I was driving. I was given a number of tasks during the program which made me pay attention to different aspects of the vehicle. Observations I made during the program allowed me to come up with new ideas that led to improvements of the new Sportage."

"We tried to create the most convenient and intuitive environment for the driver, just like an aeroplane cockpit. The speedometer and other displays are positioned on the upper part of the dashboard to make them more visually accessible. Audio and climate control buttons are placed at an optimal height for ease of use."

Convenience in an attractive package

Since the third generation Sportage R scored high on design, the fourth generation Sportage had a tough act to follow. The design team tried to build on its strong design heritage by improving on the design profile of the third generation Sportage R. The top priority area for improvement was driver visibility which had received a significant number of complaints. Yet, it did not take long for the design team to realize that improving visibility would require some compromises to the design. The width of the A pillar was reduced to minimize the blind spot on the upper left and right; the installation height of the outside mirrors was lowered while ensuring that the drivers' field of vision allows for the detection of bicycles and pedestrians. Rear visibility was also improved by increasing the height of the tailgate glass and pushing the rear door glass further back, thereby minimizing the width of C pillar. Thanks to the innovative design changes made, rear visibility was significantly improved despite the inherent limitations of the Sportage, which lacks a quarter glass between the rear doors and the tailgate.

Seat designs were also carefully reviewed. Since the height of the new Sportage is identical to the previous generation model, designers had to find inventive ways to make the interior more spacious. For example, the seating was reviewed and as a result the floor in front of the rear seats was lowered by 40mm. This allows rear seat passengers to be more comfortable as their legs are better supported by the seat cushions. The reclining angle was increased to further improve the rear seat.

The design team also considered enabling the rear seats to slide back and forth, or even to 'fold and dive' for maximum versatility. However, sliding rear seats were ultimately discarded as such features are of more value for larger vehicles with third row seats. As a result, efforts were concentrated on incorporating improvements that could deliver the most noticeable benefits.

Building on strength: Luggage space

More luggage space is an important factor in the popularity of SUVs. The fourth generation Sportage is 20mm longer in length compared to the third generation Sportage R which contributes to the increase in interior space by 15 liters alone. Thanks to other improvements made, the overall luggage capacity has increased by 58 liters, which brings the total to 128 liters when the luggage board is placed on the floor of the luggage compartment. Elimination of various dead spaces contributed significantly to the increase in luggage space. Efforts were also made to accommodate oversized suitcases in the luggage compartment and were successful, resulting in some design changes to the luggage board. The luggage board is a device which enables a flat surface to be created when the rear seats are folded. The new design allows the driver to move the board upwards to make more space for taller objects.

Designers also found and eliminated dead space in the center console. The previous generation Sportage had a elongated console design with a gear shift lever, cup holder and armrest all arranged in a single row formation. The new design places the lever and other elements in a double row formation, improving the functionality of all the elements, providing a longer armrest and a bigger and more practical console.

PERFORMANCE

FUN TO DRIVE AND LOWER EMISSIONS

High efficiency and low emissions are now the top priorities in the automotive industry. Meanwhile, customers still want their cars to be fun to drive. Expectations for high performance is even stronger among SUV drivers, which presents an extra challenge for the engineers involved in the development of a new SUV. The fourth generation Sportage was carefully crafted to satisfy all expectations.

UII 1.7 DIESEL ENGINE

Downsized for better performance

17% increase in engine efficiency

10% improvement in overall fuel efficiency

Lower emissions and noise reduction

*The specifications may be vary by market.

Power in a small package, UII 1.7 Diesel Engine

Improving on an already high fuel efficiency was a top priority for the fourth generation Sportage, which led to a weight reduction. The need for higher fuel efficiency led to the development of the UII 1.7 diesel engine, which offered an alternative to the R 2.0 diesel engine. With maximum power output of 186ps and maximum torque of 41.0kgf·m, the R 2.0 diesel engine enabled the fourth generation Sportage to achieve 14.4km/L (2WD, 6-speed AT, 17 or 18-inch wheels). The new UII 1.7 diesel engine is surprisingly powerful with maximum power output and torque at 141ps and 34.7kgf·m, respectively. Combined with a 7-speed DCT, this gives Sportage a high fuel efficiency of 15.0km/L (2WD, 7-speed DCT, 17-inch wheel) and dynamic performance characteristics.

The UII 1.7 diesel engine is the key to achieving the significant boost in fuel efficiency. Thanks to the 17% increase in engine efficiency compared to the 2.0 diesel engine, overall fuel efficiency is improved by nearly 10%. An ultra high fuel injection system and a high efficiency electronically controlled turbo charger are some of the advanced technologies which enabled a higher power output, fuel efficiency improvement and emissions reduction all in a single package. The optimized turbo charger effectively supplies the necessary amount of air at the mid-rpm range making highly efficient operation possible during everyday driving conditions. The engine pistons were treated with a nano diamond coating for a further efficiency gain. The thickness of the cylinder bloc was significantly reduced providing a significant weight reduction.

A combination of Lean NOx Trap (LNT) and Diesel Particulate Filter (DPF) trap was incorporated to make the emissions Euro 6 compliant. The Lean NOx Trap is more than 60% efficient at reducing NOx compared to a conventional Diesel Oxidation Catalyst (DOC).

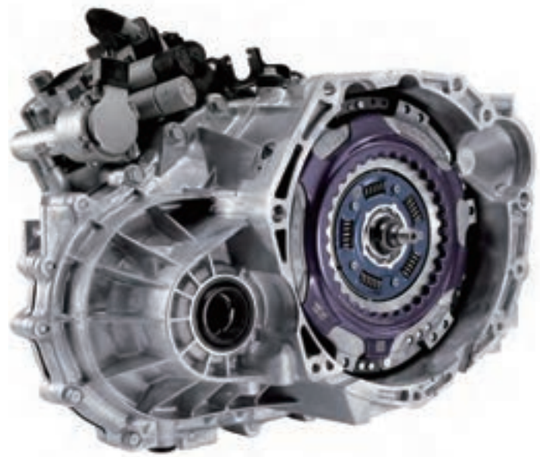
Adjustments were also made to reduce noise; for example, a rubber coating was applied inside the sprocket to muffle the noise between the engine chain and the sprocket. The oil pan, cylinder bloc cover, turbo charger and high pressure pumps were all improved to ensure the engine operates more quietly, which in turn contributes to a significant reduction in the overall vehicle noise when in operation. All teams involved in the engine development did their utmost to contribute towards creating the high efficiency, high performance UII 1.7 diesel engine with low emissions and noise, which in turn has made the new Sportage an outstanding vehicle.

Operation mode 2WD/4WD
Maximum power output 186ps
Maximum torque 41.0kgf·m
Fuel efficiency 14.4km/L
6-speed AT/MT

Operation mode 2WD
Maximum power output 141ps
Maximum torque 34.7kgf·m
Fuel efficiency 15.0km/L
7-speed DCT

7-SPEED DOUBLE CLUTCH TRANSMISSION

Creating the optimal combination of double clutch, actuator and control logic
Smooth operation and quick shifting
Great fuel efficiency and performance



7-speed DCT: The best of both worlds

An automobile harnesses power from its engine to make it move and the transmission plays a crucial role in converting the power from the engine into the right speed and torque level. A Manual Transmission (MT) is very efficient yet cumbersome to operate. An Automatic Transmission (AT) is much easier to operate, requiring almost no input from the driver yet it reduces fuel efficiency. The 7-speed DCT brings the best of both MT and AT technologies together by automatically shifting gears, smoothly and efficiently. As the name suggests, a double clutch system has one clutch for odd numbered gears and another for even numbered gears. The two clutches work in combination with a high efficiency electric motor-driven actuator. Combined with an operation algorithm, the DCT provides the convenience of an automatic transmission with the efficiency of a manual transmission.

The 7-speed DCT on the fourth generation Sportage is compact, lightweight and superbly responsive. Thanks to its quick shifting speed, a Sportage equipped with DCT responds more quickly to the driver's input and accelerates noticeably quicker compared to a Sportage with an automatic transmission. According to internal comparison test results, Kia Motors' DCT unit excels in a number of performance characteristics and is also considerably quieter. Kia Motors' engineers were thrilled with the results because the DCT was built using 100% in-house technologies.

A match made in heaven

SUV drivers prefer their SVUs to accelerate with ample power even if it feels a bit rough. The development team knew how drivers wanted their new Sportage to feel when it accelerates. Yet, unlike other qualities, acceleration was not measurable like fuel efficiency or noise level. There are also individual preferences for how acceleration should feel which made it tricky to get it perfect.

The engineers involved in the powertrain development held numerous testing sessions and meetings until they settled on the UII 1.7 diesel engine and 7-speed DCT combination, which gave the Sportage a peppy and responsive acceleration. The difference can be felt instantly and is also appreciated over time. Efficiency in day-to-day driving conditions has improved as well thanks to the UII 1.7 engine which generates maximum torque at 1,750rpm instead of 2,000rpm. The change was made because typical drivers are likely to be cruising at low-to mid-speed instead of full acceleration. Tests were conducted to find out whether Sportage operated efficiently using the new engine and the results were overwhelmingly positive.

In the end, the team succeeded in achieving their ambitious goal of making the fourth generation Sportage superior to the third generation Sportage R, not just in terms of fuel efficiency and tailpipe emissions but it is also more fun to drive.

DRIVING EMOTION

STRIVING FOR THE PERFECT RIDE

Great ride quality is not achieved overnight. It takes experience, significant R&D efforts and technological advancement to make improvements. The fourth generation Sportage builds on the experience and knowledge gained from the previous models and takes ride quality to the next level. However, It is not perfect yet. Nevertheless, the combination of sporty acceleration and a sedan-like refined ride quality takes the fourth generation Sportage closer to perfection than ever before.

SUV drivers enjoy a sporty feel but also yearn for sedan-like ride quality when cruising.
A vehicle body with high rigidity can help achieve great ride quality. This is why the body of the fourth generation Sportage is built with 51% high strength steel plates, made using advanced technologies such as hot-stamping and roll-forming. The use of galvanized steel plates was also increased to 73%.

A safer body for everyone inside and outside the vehicle

High rigidity is essential to creating a great car. However, it also needs to be lightweight and high strength steel plates provide a way to achieve this as they have a much higher tensile strength but does not weight more. 51% of Sportage's vehicle body parts are made of high strength steel which is a three-fold increase from 18% in the third generation Sportage R. Hot-stamping and roll-forming technologies were also used, further increasing rigidity. Hot-stamping is a new method of making parts by heating high strength steel plates to 900℃ and quickly cooling it as soon it is press molded, giving it extra strength. Roll-forming is a continuous bending operation performed on a metal strip at room temperature for extra strength. Many of the parts for the lower part of the new Sportage's body were made using the roll-forming method. The proportion of galvanized steel plates was also increased to 73%.

Thanks to the use of advanced materials and processing methods, torsional rigidity of base vehicle frame without hood, door and tailgate was improved by 39%. Torsional rigidity determines how much a vehicle is prone to bending in the direction of travel. Vehicles with higher torsional rigidity have improved vehicle stability. Torsional rigidity is especially important for SUVs because it can counteract the sense of instability caused by the high center of mass due to the taller body.

The new Sportage is built to protect both the people inside and outside of itself. In South Korea, 30% of road accidents involved pedestrians; it was therefore, imperative, to create a vehicle which could minimize the risk of serious injury to pedestrians. For example, a larger front hood could reduce the chance of a head injury. The impact that a pedestrian would experience can also be reduced if the hood crumples more easily on impact. This is why the front hood has carefully been designed larger, with a soft top structure while maintaining the overall structural strength by reinforcing the sides.

The newly developed front hood represents an important step forward because it can literally save lives. The significance of this technology is even more valuable because it is as effective as an active hood system which is much more expensive. The new hood design will be used in new Kia Motors models and will continue to evolve.

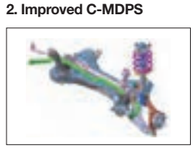
Achieving better ride quality and responsive steering

The fourth generation Sportage was designed to overcome the shortcomings of its predecessor and steering responsiveness and handling were high priority areas for improvement. The Motor-Driven Power Steering (MDPS) system was made more responsive as the third generation Sportage R owners had complained that the steering response felt slow. Structural changes were also made with the replacement of the 'I' shaped subframe to a '#' shaped subframe. The dual lower arm system was replaced with a single lower arm system for increased lateral stiffness, which in turn lead to better ride quality. It is commonly accepted in engineering that ride quality and steering characteristics are in a trade off relationship. Nevertheless, Kia Motors engineers tried to improve both qualities by improving the platform, the system geometry and by fine-tuning the whole system. Increased vehicle body stiffness enabled the team to make significant progress, resulting in greatly improved responsive steering and stability for a 'fun to drive' experience. Thanks to the improvements made, the new Sportage effectively absorbs shocks when driven on uneven road surfaces. Numerous tests were conducted and adjustments made to the steering system to achieve that perfect on-center feel with the steering wheel returning to center when slightly deflected.

Front wheel suspension

1. Changes made for improved steering responsiveness (Gear box position change)

2. Improved C-MDPS



Rear wheel suspension

1. Rear subframe structure changes (Lateral stiffness)

'I' shape '#' shape

2. Dual lower arm (Increased lateral load resistance)

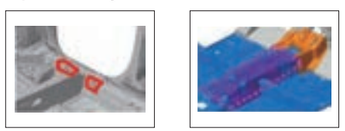
Single Dual

Satisfying high standards: noise and vibration

When it comes to managing Noise, Vibration and Harshness (NVH), the goal is not to eliminate them all, but to filter out the unpleasant bits and create the right combination of NVH which is pleasant and unique to the vehicle. Optimizing NVH is easier said than done and it takes a comprehensive set of skills to succeed. The development team succeeded to achieve significant improvement in all three areas. First, a number of noise reduction measures were made such as the use of improved sealing and noise absorption materials to block out undesirable noise. Second, the booming noise and vibrations created during acceleration were reduced by using high strength engine room, side members and panels as well as improved engine mounting parts. Third, road noise was more effectively blocked through measures such as the use of a rear cross member bush, optimization of the rear strut vehicle body, removal of side seal holes and replacement of rear wheel guard material. Using more sound absorption material is not always the best way to reduce noise because it adds weight to the vehicle and results in reduced fuel efficiency. Therefore, NVH engineers strived to achieve the best results using the least possible amount of noise absorption material. Thanks to their ingenuity and hard work, the fourth generation Sportage has unique and refined NVH characteristics.

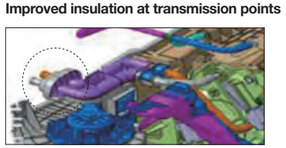
Engine sound improvement

Improved sealing



Wiring fixing point Center tunnel sealing

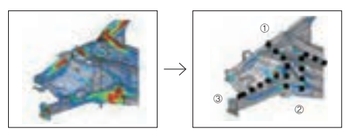
Improved insulation at transmission points



H/VAC insulation

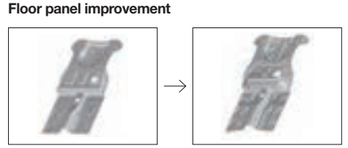
Booming noise / Vibration improvement

Increase side member stiffness



①Upper and Lower part ②Cowl and Strut ③Dash and Side

Floor panel improvement



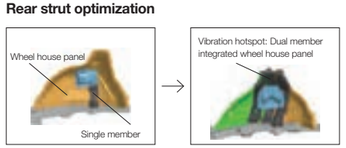
Bead, optimized double curvature shapes

Road noise improvement

Employment of rear cross member bush

Without bush Bush

Rear strut optimization



SL: Single member structure QL: Integrated dual member

C O N V E N I E N C E

SAFE AND CONVENIENT

Safety and convenience are of the utmost importance in an automobile. After all, automobiles are built to safely transfer people from one place to another while providing an enjoyable experience. The engineers behind the fourth generation Sportage were well aware of this and designed the Sportage with many new features to make it safer and more comfortable.
Built by some of the world's best engineers, using state-of-the-art technologies, the Sportage will make driver's day, every day.

Helping drivers to stay focused on the road

Driving is an activity which requires multitasking. The driver has to stay focused on the road yet often their attention is diverted away from driving for other tasks. The fourth generation Sportage is built to help drivers stay focused on the road. The information display cluster has an improved Graphic User Interface (GUI), which delivers the information in an intuitive manner. Drivers can choose which information is displayed by selecting 'User Setting Mode' and customizing the display cluster. The display cluster can also show multimedia information from the navigation and entertainment system. Sportage comes with a 3.5-inch mono color display or a 4.3-inch color display. Both are backlight which ensures visibility no matter what the conditions are. The improvements made to the rear view camera display are also incredible. The previous generation system only showed static information such as parking guidelines. The new system can also show vehicle trajectory lines using input from the steering system. It also has an improved diagnostics system to better prevent any malfunction.

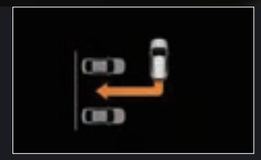
Convenience of wireless charging

The fourth generation Sportage was built to accommodate the latest lifestyle needs. Today, being stuck with an uncharged smartphone can be a significant inconvenience. It is not a serious problem when you are in the office or at home. However, it can be a problem if you are in a car which does not have a charging port or cable. The Sportage gives peace of mind with its onboard wireless phone charging system.

All drivers need to do to charge their phone is place it on the center fascia tray which has a wireless charger installed underneath. The charger draws electricity from the battery and passes it through a coil and creates an electromagnetic field. The energy from the electromagnetic field charges the smartphone battery. The tray incorporates a number of inventive design elements to enable it to work with the charger. First, it has a rubber pad to prevent the smartphone from sliding off. Second, the tray has an indicator light on top for checking its operation status. An orange light indicates charging is in process and a green light indicates that charging is complete. The charger is automatically turned off when the smart key is in operation, which is a safety mechanism to prevent malfunction due to system interference. It required a considerable amount of research and countless tests to create the charger especially because new smartphones are constantly entering the market. The system was tested throughout the development period and improvements were made until all the concerns had been addressed. The current design and location were chosen for maximum convenience and minimum distraction.

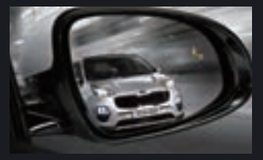
SAFETY & CONVENIENCE

BUILT FOR EXCEPTIONAL SAFETY AND CONVENIENCE

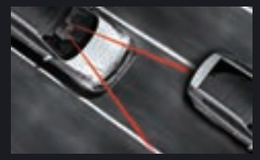


ASPAS
(Advanced Smart Parking Assist System)
The ultrasonic sensor detects the parking space and the system controls steering for easy parking. Kia Motors ASPAS outperforms competitors in perpendicular parking.

CRUISE CONTROL
The cruise control function allows the driver to set the vehicle speed at a desired speed to ensure the speed limit is observed or to achieve higher fuel efficiency.



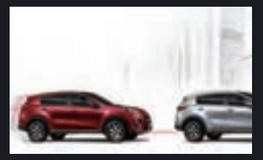
BSD
(Blind Spot Detection)
This system helps detect when a vehicle is in the driver's blind spot and provides an alert. When the car is in reverse, the system also warns the driver of vehicles approaching from the side.



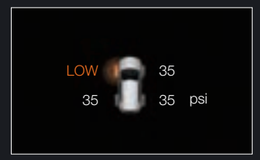
LDWS
(Lane Departure Warning System)
The LDWS detects the lane and informs the driver with a visual cue and warning sound when the car is straying from the lane. The system also sends a signal to the Autonomous Emergency Braking (AEB) system when it detects a collision risk, whether that be a pedestrian or a car in front.

SMART POWER TAILGATE
The system automatically opens the rear tailgate when the driver stands behind the vehicle with the key for more than three seconds.

ADVANCED AIRBAG SYSTEM
The advanced airbag system features sensors that detect impact levels and the presence of a front passenger, helping to manage airbag inflation. The system prevents deployment of passenger seat air bags when there is a child safety seat installed or the seat is unoccupied.



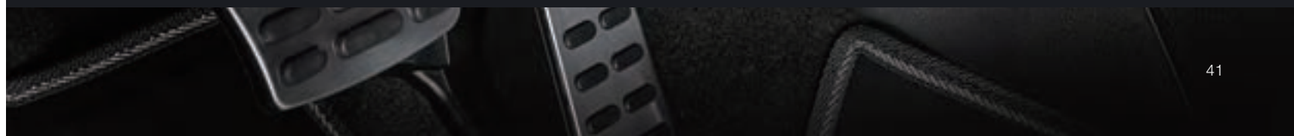
AEB
(Autonomous Emergency Braking)
If a crash is imminent with a vehicle in front or a pedestrian, the system sends a warning and deploys the AEB, providing an additional safety feature.



TPMS
(Tire Pressure Monitoring System)
TPMS prevents accidents by monitoring the air pressure of the tires and indicating to the driver when it falls below a certain preset level.

SMART WELCOME
Smart welcome turns on the lamps and unfolds the side mirrors when the driver comes within three feet of the vehicle with the smart key.

HBA
(High Beam Assist)
HBA detects both oncoming vehicles and vehicles ahead in the same lane at night and switches the headlamps to low as appropriate.



Sportage has played an important role in the history of the SUV. It has led innovation within the industry.

The fourth generation Sportage is about to open a new chapter in its history.

Full of innovation and great performance characteristics, Sportage is here to mark the beginning of a new era of urban SUVs.