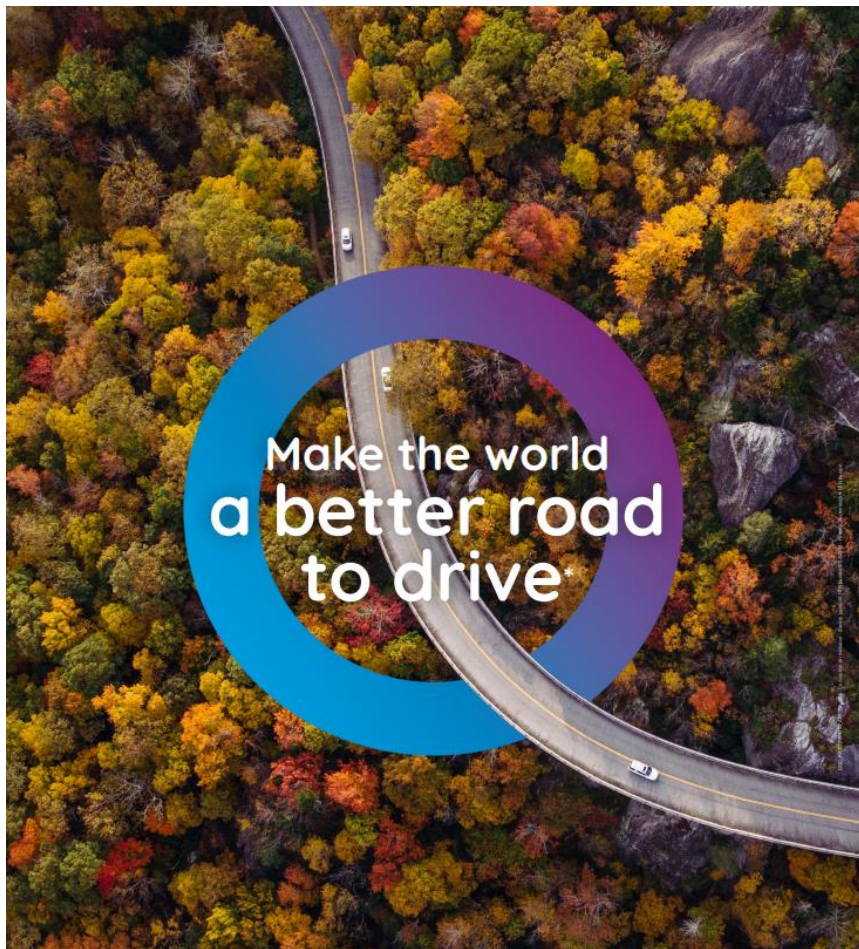


PRESS KIT

AUTOMECHANIKA SHOW

SEPTEMBER 2024



NTN

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EDITORIAL

"Since its creation, the NTN Group has always supported the players in the automotive aftermarket, whether they be distributors or repairers. Driven by this dynamic and our philosophy "Make the world a better road to drive", this support now involves extending our offer to meet new challenges and an ever-increasing demand for premium quality products. Following the successful launch of our shock absorber range at the end of 2023, we are proud to present 2 new ranges of sensors and remanufactured driveshafts at Automechanika.

Thanks to this consolidated offering, which will continue to grow around our centers of expertise, we are more determined than ever to develop NTN Europe's presence in the Middle East, Africa, Europe and Brazil, where there is no shortage of growth opportunities! To achieve this, each member of the sales team has a role to play. I would like to take this opportunity to congratulate once again Leonardo ARAUJO, who has taken over as President of the Group's Brazilian subsidiary, and Pascal LANGER, who has succeeded him as Sales Director for EMEA and Brazil. As part of our strategy to expand into Europe, we will also continue to maintain and enhance our partnerships with international groups (ITG), which play a key role in this area.



Christophe IDELON

Vice President Automotive
Aftermarket NTN Europe



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Innovation, a vector for diversification

One of the pillars of NTN Europe's growth is the development of its aftermarket offering. The equipment manufacturer is stepping up the pace in this area this year with 2 new range launches in addition to its shock absorber offering. In order to maintain full control over this development, NTN Europe is focusing on products that are complementary to its existing range and directly linked to the Group's business expertise. In this way, it is capitalising on its technical capabilities while surrounding itself with industrial partners to guarantee its customers the high quality of the products it markets.

A major comeback in the sensor market

With this in mind, NTN Europe is returning to the forefront of the sensor market this autumn, considerably expanding its offering. A pioneer of ASB technology in 1997, thanks to its expertise in LIDAR and torque sensors, and with undeniable mechatronics know-how, the equipment manufacturer has until now had a range of wheel speed sensors comprising 470 references. Today, it is launching nearly 1,150 new products, covering 80% of the needs of the European market for 6 additional types of sensors.

"The sensor market is a technical, complex and competitive market, which nevertheless offers excellent growth prospects with the electrification of the vehicle fleet on the one hand, and the increase in the number of sensors fitted to internal combustion vehicles on the other," explains Carole BERWALD, Head of the sensor range at NTN Europe. *"Today, a vehicle can have up to 300 sensors. Electronics account for between 30 and 40% of their total hardware value. They provide functions linked to compliance with environmental standards, comfort, performance and driver safety."*

This massive launch makes the sensor offering a product family in its own right within the equipment manufacturer's portfolio. It now comprises 7 types of sensor.

For engine management :

- **Camshaft position sensor (CMP).** This precisely determines the position of the camshaft to tell the ECU when to inject fuel into each cylinder to ensure the engine starts.
- **Crankshaft sensors (CKP).** It calculates engine speed to adapt fuel injection to the vehicle's needs, for a comfortable drive.
- **Coolant temperature sensor (CTS).** It measures engine temperature and transmits it to the ECU, which adjusts injection time and ignition angle in the event of overheating to ensure engine safety.

For exhaust control :

- **Exhaust gas pressure sensor (EGP).** It compares the difference in exhaust gas pressure at the inlet and outlet of the particulate filter to ensure that the vehicle complies with European standards governing pollutant emissions.
- **Exhaust gas temperature sensors (EGT).** By monitoring the temperature of the exhaust line, it protects its components from overheating.

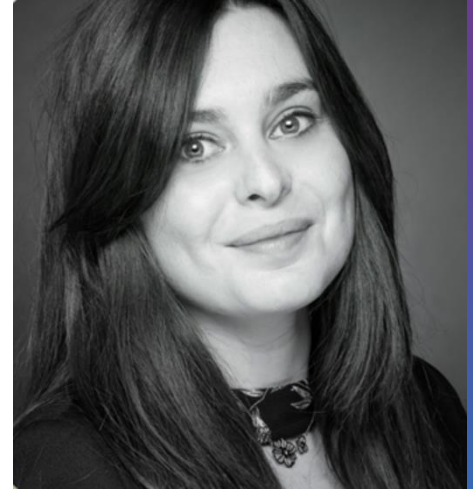


For safety and comfort:

- **Tyre pressure sensors (TPMS).** By monitoring tyre pressure and reporting any anomalies, it ensures vehicle safety.
- **Wheel speed sensors (ASB),** NTN Europe's current range of sensors. This sensor reads the speed of rotation of the wheel and informs the on-board systems (ABS, EPS, etc.), which are activated if necessary to ensure the safety of motorists.

With the launch of this range, NTN Europe, a global player with a rich product portfolio, intends to establish itself as a one-stop-shop for professionals in the field of sensors too. These ranges, which are among the most comprehensive on the market from a single supplier, enable NTN Europe to meet an existing need for premium quality. Marketed under the SNR brand, these sensors are tested and approved by NTN Europe's quality team according to strict specifications. As part of its eco-responsible approach, the equipment manufacturer has also chosen to eliminate plastic from the vast majority of packaging in this family.

"This launch, while important, is just the beginning! It's just the first step that we've prepared very carefully so that we can approach this market in the right way. The references we're launching today cover thermal applications, because these are the vehicles that are currently most in need of replacement. But the aim of this range is, of course, to expand over the coming months and years to make NTN Europe a challenger in this market. Extensions to this product family will aim to cover the latest LV models, extend to HGVs, support electrification and integrate new types of sensors in order to always offer the widest SENSOR range that is as consistent as possible with our customers' requirements.



Carole BERWALD

Responsible for the sensors range at NTN Europe



Remanufactured driveshafts: A unique offering at the heart of our CSR strategy

The launch of this new range of remanufactured driveshafts, previewed at Automechanika, is directly in line with the company's CSR strategy. This is based on 5 major areas of constant progress. In the year 2023, NTN Europe reduced its atmospheric emissions by 3.9%, its water consumption by 2.2%, its energy consumption by 8.7% and the proportion of waste recycled was 97% (reference year 2022). 5^{ème} pillar of this strategy, the NTN Group has also set itself the target of achieving carbon neutrality by 2050, i.e. reducing its greenhouse gas emissions by 90% compared with the reference year 2018. The first deadline, 2030, is to halve the Group's carbon emissions from scopes 1 and 2. These include emissions from production sites, tertiary buildings and electricity producers.

This ambitious decarbonisation plan is supported by the Group. An initial annual budget of €1.6 million, allocated to NTN Europe, is specifically dedicated to these initiatives, which are bearing fruit. By 2023, NTN Europe had already reduced its carbon emissions for scopes 1 and 2 by 44% compared with 2018 and should achieve the -50% target for 2030 by 2026. In concrete terms, NTN Europe's actions focus on reducing energy consumption and producing less carbon-intensive energy to limit its environmental impact. On the sites, this involves an energy management policy and the installation of systems to recover the heat generated during production to heat the premises. Production resources and their use are also optimised. At the same time, a photovoltaic project has been launched in Italy to cover 30% of the plant's energy needs. These initiatives, which are part of an overall drive to modernise facilities and improve employee comfort and safety, were recognised once again this year by the Ecovadis rating agency. NTN Europe was awarded the Gold level of commitment.



However, the NTN Group's initiatives must not be limited to the production phase. They must also take into account the carbon impact of upstream and downstream stages such as: the transformation of raw materials before their purchase, their transport as well as that of finished products, the use of these products and their end of life. To achieve this, the Group gives preference to suppliers with an ambitious CSR policy, uses environmentally friendly, recycled or recyclable materials such as steel produced by the electric arc process, and reworks the design of its products. The challenge is to reduce the carbon emissions of products during their use by limiting friction and reducing their weight. With this in mind, NTN Europe is turning to the circular economy and launching range of remanufactured transmissions. By opting for remanufacturing rather than producing a new transmission, the carbon footprint of this part can be reduced by up to 75%. This is because it is the manufacturing phase of the raw materials, components and transport that emits the most carbon. By remanufacturing, most of these components can be reused, with the exception of bellows, nuts, clamps and grease.

The launch of this refurbished range of products also enables NTN Europe to respond to a market trend in favour of re-used parts. In Europe, 7 out of 10 motorists now say they are prepared to accept this type of part to maintain their vehicle. This change in purchasing behaviour, which is prompting both vehicle manufacturers and equipment manufacturers to take an interest in reconditioned parts, is being supported by the public authorities. Since 2017, French law has required repairers to present their customers with a quotation that also includes reconditioned parts. At European level, an action plan has been

supporting this initiative since 2020, to give motorists the power to make their own decisions.

"As a manufacturer of a range of new driveshafts since 2017, we know this market well. Refurbished driveshafts are playing an increasingly important role, driven by refurbishers who have been developing their expertise in this product since the 2000s. They now account for 30 to 40% of the available range, with excellent prospects for growth.



Romain PETELLAZ

Responsible of the driveshafts range at NTN Europe

The maturity of this market provides an excellent opportunity for NTN Europe to integrate a range from the circular economy into its portfolio. This new range of remanufactured driveshafts enables NTN Europe to diversify its offer by proposing an alternative to its ranges of new products and thus to respond to the environmental concerns of its customers.

"Renovation is a profession in its own right, requiring real know-how," says Romain PETELLAZ. "NTN Europe, 2nd world player in OE and leader in aftermarket, is positioned alongside

them and brings to the market its own expertise as well as its high level of requirements, particularly in terms of quality, which is a crucial point when it comes to refurbished parts. It's vital to be able to reassure customers about their reliability. This is what we intend to do under our SNR brand, which has been a mark of trust for many years.

As with all its ranges, NTN Europe places quality control at the heart of its remanufacturing process. Three main control stages are scrupulously respected throughout the remanufacturing process:

1. After disassembly, an initial inspection eliminates any components that are too damaged. The more fragile rubber boots and collars are automatically replaced.
2. Once cleaned, the remaining components are visually inspected and tested to determine whether they need to be replaced, refurbished or reused.
3. At the end of the process, once the components have been manually reassembled, a final phase of measurements and tests on test benches is carried out to guarantee the reliability of the product.

Always faithful to its visual identity, NTN Europe has, however, redesigned the packaging for this new range. Yellow and blue have been replaced by uncluttered kraft packaging that reflects the concept of remanufacturing. This approach is also summed up by 6 key words: Rethink, Repair, Recycle, Reduce, Reuse and Repeat. Finally, a logo has been specially designed to highlight the value of all the stakeholders and encourage repairers to take part in this logistical loop by returning their old materials, via distributors, to NTN Europe.

When it is launched at the end of 2024, this range will comprise 64 refurbished products, available from stock. It will then be extended, alongside the range of new driveshafts, to provide the market with an essential dual offering. The objective for remanufacturing is to have

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200 references by 2026 to cover the most common vehicles over 10 years old on the European market.



A product portfolio between redesign and development

This year, the modules that structure NTN Europe's offer have been redesigned in response to the range development that is taking place at the equipment manufacturer. The CHASSIS range remains unchanged, while incorporating the new range of shock absorbers. The POWERTRAIN and DRIVELINE families have been merged to better prepare for the electrification of the fleet, leaving room for the emergence of a third family in its own right: SENSORS, comprising the new range of sensors.

At the same time, NTN Europe is drawing on its expertise to continue adapting its products to cover the mobility market as a whole, which includes TRUCKS and 2 WHEELS in particular. Not forgetting to accompany its products with a range of SERVICES essential to all those involved in distribution and repair.

Shock absorbers: the flagship launch of the CHASSIS module

In December 2023, NTN Europe announced the launch of its new range of shock absorbers in collaboration with LTM, part of the Mecatech Group. This range is the result of NTN Europe's mastery of the corner wheel (wheel-transmission-suspension assembly) and the world-renowned manufacturer's industrial expertise. This partnership is a great opportunity for NTN Europe to diversify its range, while offering products whose quality meets its high standards. Nine months after this successful launch, the shock absorber range will be exhibited for the first time at the Automechanika show.

NTN Europe has taken into account the expectations and constraints of the world's leading car manufacturers, with whom it works in the field of suspension, to develop more than 800 gas shock absorber references that complement its SNR suspension kits. This technology, on which the equipment manufacturer has focused, is the

most commonly fitted in series production and therefore the most frequently encountered in the aftermarket. This range is a guarantee of quality and ease of fitting for repairers, while ensuring optimum levels of comfort and safety for motorists. The range has been designed to meet all the needs of the EMEA (Europe, Middle East and Africa) region, covering more than 80% of the European car parc.

To attest to the quality of its new range of shock absorbers, NTN Europe has called on Yannick Baillat, a specialist in automotive testing and an expert in the development of suspension systems (shock absorbers, tyres, brakes, suspension). Having worked on numerous projects for the Renault Group alongside some of the world's leading tyre and shock absorber manufacturers, he is now putting his long-standing expertise and excellent knowledge of the OE and aftermarket markets to work for the automotive industry. The École de la Dynamique Automobile, of which he is Chairman, offers its customers road tests and technical training courses, particularly on shock absorbers. At a time when vehicles are becoming heavier and heavier, shock absorbers play an essential safety role in ensuring the car's stability and roadholding.

Based near Alès, NTN Europe met Yannick Baillat at the region's Mechanical Engineering Centre. From that moment on, great synergies based on the sharing of knowledge and the quest for quality developed between the expert and the equipment manufacturer. To accompany the launch of its range of shock absorbers, NTN Europe decided to put it to the test on the road. Carried out on a Citroën C3, a model widely used in France, in accordance with manufacturers' standard procedures, the tests enabled the quality of the shock absorbers' performance to be quantified. Numerous criteria are assessed both hot and cold to determine their impact on steering, road holding and vehicle safety, as well as on driver comfort,



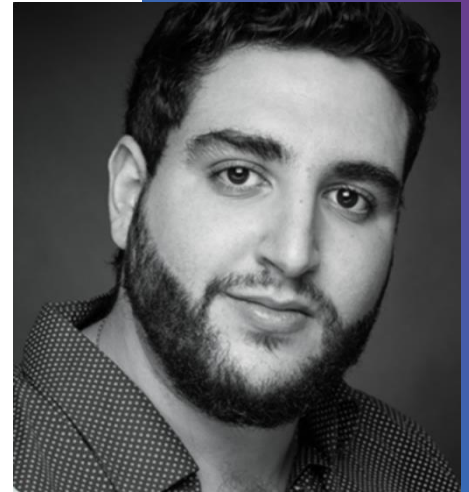
whatever the condition, road surface or driving situation.

Compared with 3 competing shock absorbers (including the one fitted as standard), SNR shock absorbers stood out positively during these tests. They are neither too soft, which would impair trajectory control and therefore vehicle safety, nor too firm, which would result in a loss of comfort for the driver and passengers.

- In terms of **handling**, on good roads SNR shock absorbers offer performance equivalent to that of the original shock absorber and competitors, with averages of between 7/10 and 8/10. The same is true on bad roads. With an average of 7.5/10, SNR shock absorbers overtake the No. 1 competitor and match the level of quality offered by the standard shock absorber.
- The comparative tests also revealed that SNR shock absorbers provide excellent body support. In terms of **steering and handling**, NTN Europe achieved averages of 8/10 and 8.5/10 respectively, as did the No. 2 competitor's shock absorber. The original shock absorber scored an average of 5/10, while competitor No. 1 scored 6/10.
- SNR shock absorbers also offer real added value in terms of **comfort**. With an average score of 8.5/10, they offer better balance than the standard shock absorber (7/10) and its two competitors (5/10 for No. 1 and 8/10 for No. 2).
- Finally, the performance of SNR shock absorbers was also praised in the **VDA avoidance test**. They received an excellent average score of 9/10, as did the No. 2 competitor, compared with the original shock absorber and the No. 1 competitor, which received scores of 5/10 and 6/10 respectively.

Evaluated according to the very strict criteria of the original equipment market, SNR shock absorbers offer superior performance to the requirements of

the aftermarket. They fully meet the demand for premium products.



Jonathan MORENO

Responsible of the Shock absorbers at NTN Europe

"We are delighted to see how well this range of shock absorbers has been received by the market. Recognised for our expertise and the quality of our products as Europe's leading manufacturer of suspension kits for both original equipment and aftermarket, we enjoy a high level of brand awareness. To date, we have received a good level of orders. We are also very satisfied with the coverage rate of this range at its launch, but we will continue to develop it to offer the most complete range possible in the years to come".

For this launch, the equipment manufacturer has also opted for an ambitious communication plan to give these products maximum visibility over the first 6 months of the year. Digital and multimedia aids, such as tutorial videos and technical documents, are available to guide repairers in their work.

Given the success of the 800 references already launched, extensions based on other high-

potential references are currently under study, with the aim of covering 90% of the European market in the near future. NTN Europe's range of shock absorbers will also evolve in parallel with its range of suspension bump stops, to which it is complementary. The CHASSIS family, which is central to NTN Europe, will thus continue to expand over 2025 to become a key player in the wheel corner.

With a view to offering its customers the most comprehensive and optimised range possible, NTN Europe is also working on the development of "Super kits" for its suspension range. In a single package, they will combine a reference from the equipment manufacturer's range of high-quality shock absorbers with the associated suspension kit. Selected from high-potential references, these kits will ensure perfect compatibility and exceptional performance, as well as optimum safety with a completely new suspension function, to meet the expectations and specificities of the market.

POWERTRAIN: a reorganisation in response to the electrification of the fleet

NTN Europe's POWERTRAIN module is undergoing a major transformation. It will continue to bear the same name, but now incorporates the DRIVELINE components of the equipment manufacturer. This transformation directly echoes that of the European vehicle fleet, where the first electric vehicles are ageing. This is creating an EV aftermarket, fed directly by specialists in the refurbishment of this type of powertrain. The new POWERTRAIN module brings together all the power transmission components for the engine and gearbox. The electrification of vehicles is leading to the disappearance of the gearbox and internal combustion engine in favour of a new unit called ePowertrain or eAxle. This is made up of 3 elements: the control unit (with no bearings or mechanical parts), the transmission, also known as the reducer (similar to the gearbox) and the electric motor, the latter two housing bearings specifically for electric vehicles.

"It is with a view to integrating these new products, developed as original equipment, into our aftermarket offering in the years to come, that the POWERTRAIN family is already evolving and now includes the eAxle. However, with 98% of the European vehicle fleet still made up of internal combustion vehicles, NTN Europe is not turning away from its product ranges adapted to internal combustion engines, which still form the core of the POWERTRAIN offering. As a leading equipment manufacturer, we are preparing for the future so that we were able to be a key player in tomorrow's fleet, while continuing to develop our ranges to meet today's needs, which are directly linked to the ageing of the fleet".

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Anaïs LE FOULER

Responsible of the
POWERTRAIN range at NTN Europe

For internal combustion engines, this newly-formed module offers **bearings for standard gearboxes** and an the **engine drive range** comprising traditional POWERTRAIN family products such as timing kits, accessory kits and chain kits, which were launched in June 2023 to meet emerging demand from an ageing fleet. Whereas just a few years ago, chain kits were used beyond the life of the vehicle, vehicles now run for an average of 12 years, which may mean that this part needs to be replaced. NTN Europe is responding by regularly expanding its range, which already includes 100 timing chain references, with further extensions planned for 2024.

The POWERTRAIN module also has a new sub-category dedicated to engine **thermal management**. **This includes** the range of electric water pumps (main and accessories) launched in 2022, which is set to grow in importance over the coming years, given their central role in both hybrid and purely electric engines. New models will be launched from the end of 2024.

Finally, by integrating the gearbox into the POWERTRAIN module, NTN Europe has been able to launch new **eAxle bearings**. **These are** gearbox and electric motor bearings with technical characteristics that enable them to meet the greater constraints of electric motors and customer requirements in terms of durability. In particular, they must withstand higher temperatures and higher rotation speeds. To achieve this, NTN Europe has developed 2 new bearing ring materials with special thermochemical treatments. As the bearings are conductive by virtue of their composition, they must also be adapted to prevent the electricity that drives the motor from passing through them and damaging the rolling elements. To avoid premature failure of the bearing's active surfaces, two solutions have been devised. The use of ceramic balls or the insulation of the outer diameter of the rings on the one hand, and the diversion of the electric current by means of seals or non-conductive lubricants on the other. NTN Europe, which manufactures bearings for the gearboxes and electric motors of the major European manufacturers, will also continue to expand this range gradually over the coming years for the aftermarket.



TRUCK range: consolidating its position

The HGV range is also in the spotlight in 2024, with the launch at the beginning of the fiscal year of a new range of 32 hub references with integrated bearings. This solution has been specifically designed to meet the needs of HGVs, which have very different constraints from light vehicles. For them, every stop is synonymous with a loss of productivity. It is therefore essential to keep the frequency and duration of vehicle downtime to a minimum. One way of doing this is to replace wheel bearings as a preventive measure (in line with manufacturers' recommendations). Thanks to NTN Europe, it is now possible to go even further.

"By offering to replace the hub-bearing assembly rather than each bearing individually, NTN Europe is providing a complete solution that is quicker and easier to dismantle and fit to the vehicle, thereby reducing the duration of the repair while guaranteeing optimum repair quality. This also enables the Group to take part in the current trend for repairers to work with pre-assembled sub-assemblies in kit form," explains Romain PETELLAZ, Truck Range Manager at NTN Europe.

NTN Europe has targeted the main manufacturers (Volvo, Renault Truck, DAF, Mercedes-Benz, Scania, BPW and SAF) to launch an initial wave of high-potential references, which together cover 85% of the European HGV fleet. The range will be gradually expanded over the coming months and years to keep pace with market trends.

The launch is part of the company's drive to extend its entire HGV range and secure long-term sales growth in this market. The range currently comprises 234 wheel bearings, 356 gearbox and differential bearings, 9 alternator bearings and 32 new hubs with integrated bearings.

"A major player in OE for both light commercial vehicles and heavy goods vehicles, our Truck aftermarket range includes innovative OE-quality solutions, tested and approved by our original

equipment customers. Drawing on the Group's long-standing expertise, it covers the main manufacturers of heavy goods vehicles (trucks, trailers, buses) in Europe, and is constantly expanding," says Romain Petellaz. *"Thanks to an increasingly comprehensive and varied range, with attractive volumes, carefully selected references and ancillary products such as greases and appropriate tools, we now have all the arguments we need to win over market players and to be recognised as a specialist in the HGV aftermarket."*



Wheel Hub Bearing

NEW



The 2-WHEEL market: an area for development

Thanks to its status as an OE supplier, NTN Europe also addresses the two-wheeler market with a range of parts dedicated to motorcycles and bicycles. The equipment manufacturer enjoys a leadership position among the world's leading motorcycle manufacturers. On the bike side, it is present on all the applications of some of the major players, and is working to extend its presence within specialist networks in France and Europe.

Motorcycle offer

The motorised two-wheeler sector comprises 3 segments: motorcycles, tricycles and scooters. The structure of this market, which is mainly dominated by the manufacturers, is very different from that of the car industry. There is very little distinction between original equipment and aftermarket, as maintenance is generally carried out via the manufacturer's network.

Activity in this market is therefore closely linked to its origin, leading equipment manufacturers to adopt a specific strategy. NTN Europe has a physical and local presence in 3 key markets in Europe: Italy, Germany and the UK, where the main global manufacturers it supplies are based. Thanks to its factories and sales staff dedicated to this activity, the equipment manufacturer works directly with them to develop and produce bearings tailored to their needs. This commercial proximity and its NTN and SNR brands, which are also guarantees of quality and confidence in the two-wheeler market, are not its only assets, however.

The European subsidiary of the NTN Group, which is very well positioned, notably with a major Japanese manufacturer, offers a range of bearings for steering columns, gearboxes and crankshafts. On the steering side, these technical solutions have been tried and tested by manufacturers for many years, and continue to win over new customers by meeting their exacting requirements. On the engine transmission and crankshaft side, 3 types of bearings are marketed

under the NTN and SNR brands: ball bearings, needle bearings and cylindrical roller bearings. Manufactured from high-quality steel, all three benefit from a specific internal design and heat treatment to extend their service life, even under extreme conditions. They can withstand particularly high temperatures of up to +140°C and rotational speeds of between 10,000 and 14,000 rpm.

Electrification of this market, although in its infancy for scooters, is still limited. Equipment manufacturers are being called upon more and more to optimise the technical and economic performance of their components. In addition to temperature and speed of rotation, the aim is to reduce torque and the weight of components. Already challenged on these parameters in the automotive industry, NTN Europe is keeping a close eye on market needs. The equipment manufacturer is putting its responsiveness, R&D capabilities and rigorous manufacturing processes at the service of two-wheelers to support manufacturers by continuing to design bearings that meet their specific constraints.

Bike offer

Although the cycle market has been slowing down since 2022 due to inflation, which is curbing household purchasing power and causing overstocking throughout the industry, it still has great potential in Europe. Electrically assisted bicycles (EABs) are becoming increasingly popular for commuting. By 2035, it is estimated that bicycle sales will reach 30 million (of which 50% of which will be EABs), compared with 20 million in 2015. This dynamic is being supported by the public authorities, which are promoting soft mobility and investing in infrastructure, as well as by manufacturers who are positioning themselves in this market, which offers excellent prospects for the years ahead. NTN Europe is a leader in bearings and has been a long-standing partner of major players such as Mavic since the 1970s. Today, the equipment manufacturer offers a wide range of high-quality, technically advanced solutions for all types of bicycle.



For classic bicycles, with up to 20 bearings, NTN Europe has a complete range of products for wheel hubs, headsets, bottom brackets, pedals, derailleurs and electric shifters, to ensure a smooth and precise ride for cyclists. All these products meet the stringent technical requirements demanded by these applications, such as lightness, compactness, long life, low torque and high resistance (water, pollution, oscillations, vibrations, etc.). EABs, on the other hand, are subject to more intensive use, with more frequent, longer use and an additional charge due to the battery. The mechanical parts are therefore subjected to greater stress and strain. To meet these new needs, NTN Europe is developing more robust mechanisms and specific products such as single-row rigid ball bearings, which benefit from an effective sealing system without affecting their fluidity. Or a steel needle roller bearing cage that is strong, light, rigid and ultra-compact to withstand high radial loads, high accelerations and high starting torques.

"The development of tomorrow's mobility solutions, including classic and electric bikes, is one of the pillars of the company. This echoes our 'Nameraka' philosophy, which aims to be in harmony with our environment. In this market of enthusiasts, it's essential to listen to needs and be as responsive as possible to offer appropriate solutions. We are working to develop our expertise, our network and our product ranges so that we can be recognised as a major player by manufacturers and enter the European electric vehicle market as an original equipment supplier," says Olivier Musy, Marketing Manager for the Mobile Equipment markets.

To achieve this, NTN Europe works with a number of specialist players to make its expertise available to them through innovative products. For classic bicycles, for example, the equipment manufacturer is incorporating its LUBSOLID™ technology, developed for the industrial market, to solve sealing problems on headset bearings. Made from an oil-saturated polymer combined with stainless steel balls, it resists washing and corrosion, screens out contaminants and guarantees long bearing life. At the same time, the advent of electrically-assisted bicycles and the

large number of bearings that make up their motors has given NTN Europe the opportunity to diversify its offering by supporting start-ups such as Cixi. Cixi is committed to bringing to life a new kind of vehicle, suitable for everyone, to transform passive journeys into moments of rejuvenating effort. The aim is to help them speed up the industrialisation of their innovations. Currently, the partnership is focusing on an electric pedal-generator technology with haptic feedback that promises to redefine active mobility. On the aftermarket side, NTN Europe is working with cycle repairers to supply them with bearings that are likely to be replaced during the life of the bicycle, such as the suspension thrust bearings which is integrated into the bicycle frame.

SERVICES: An ever-expanding range of complementary services

"NTN Europe has always been keen to support garages by going beyond simply supplying premium quality product ranges. That's why we are increasing the number of resources we make available to repairers, such as technical data sheets and tutorial videos. To facilitate assembly operations on our precision parts, in 2023 we also developed a range of nearly 130 technical tools, approved by SNR, in collaboration with tooling expert CLAS. But the challenges and opportunities facing professionals today are increasing all the time. We must continue to provide them with complementary service solutions that will help them in their day-to-day work challenges."

The automotive market continues to evolve. On the one hand, the vehicle fleet is ageing, generating repairs to parts that used to last the life of the vehicle, and on the other, parts are becoming increasingly technical in order to provide motorists with greater comfort, safety and reliability. Replacing them therefore requires additional expertise that repairers do not always possess. To meet this new challenge, the equipment manufacturer is developing a remote assistance service for hotline operators, to improve the support they offer for NTN and SNR products. Repairers will be able to contact a technical advisor via their smartphone, without a specific application, using a dedicated number or by scanning a QR code on the part packaging. The advisor will use the smartphone's camera to help them understand their problems and guide them through their maintenance operations. This service will also enable the advisor to send technical documents, create a report at the end of the assistance and generate a user manual to download should the situation arise again.

The mobility of tomorrow represents an opportunity for vehicle workshops to offer their customers additional services. As a player in the cycle market, NTN Europe is drawing on the Group's expertise to develop a secure bicycle station for garages in town centres and urban areas. This pay-as-you-go service will enable garages to provide their customers with courtesy bicycles while their vehicles are being repaired.



Amélie PAVIET

Marketing Director EMEA Automotive
Aftermarket at NTN Europe

A commitment to expansion driven by people and innovation

In 2021, the NTN Group adopted the "Make the world Nameraka" philosophy and made significant changes to its visual identity. One of the founding principles of this philosophy is to be in harmony with our environment. In concrete terms, this translates into 3 strategic areas: innovation (to move towards a circular economy and implement a strong CSR policy), a product offering that is expanded according to its areas of technical and industrial expertise, and geographic expansion to be connected to all market players by meeting their needs.

With this in mind, human resources in particular have been put in place to affirm the Group's presence in the European markets, the Middle East, the entire African continent and Brazil. The marketing organisation now relies on Business Developers, responsible for geographical expansion and the development of new offers, in

liaison with Area Managers to ensure NTN Europe's influence locally.

Always with the idea of being in harmony with all stakeholders, support through communication is essential. This is one of the Group's strengths today, as it strives to provide its garage customers with ever more precise and technical content through the development of media and video tutorials. NTN Europe is also involved in the world of motor sport, sponsoring an up-and-coming team of 2 young women Rally drivers, support for the team started in September 2023. Through this type of action, the equipment manufacturer seeks above all to share common values with its partners, to develop jointly with them, whether they are sportsmen, distributors or garages, to create a relationship of trust and generate added value.

NTN Group FY 2023 in figures

The NTN Group worldwide

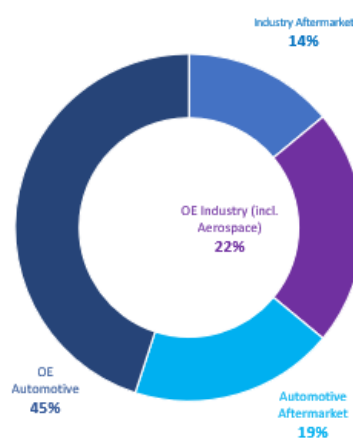
- 5.5 billion in sales* (€)
- More than 23,000 employees
- 72 production plants
- 15 research centres

NTN in Europe

- 1.2 billion in sales* (€)
- More than 5,500 employees
- 15 production plants
- 3% of sales invested in R&D

* End of March 2024

Breakdown of NTN Europe sales by BU for FY 2023 (April 2023 to March 2024)



Overview and outlook for Europe

In Central and Eastern Europe

With its 185 million inhabitants, a fleet of over 78 million vehicles and 90 commercial partners belonging to 6 international purchasing groups (ADI, ATR, GAI, GOA, Nexus, Temot), the 23 countries that make up Central and Eastern Europe offer NTN Europe excellent opportunities for rapid growth. The health and geopolitical context of recent years is now reflected in inflation which is higher than the European average, slowing down the purchase of new vehicles for the aftermarket. NTN Europe is taking advantage of this situation by maintaining a high level of product availability and continuing to put people at the heart of its commercial negotiations. Despite a period of continuing uncertainty, NTN Europe continues to extend its ranges for an increasingly wide audience in this region and takes advantage of every event to maintain contact with its partners.

In the Middle East and Africa

The Middle East region and the African market are also experiencing significant growth. Despite the economic challenges, the aftersales sector is performing strongly, boosted by a number of trends. On the one hand, the number of motorists is increasing, while the average age of the vehicles in this fleet is 12.2 years. On the other hand, a movement defending the right of consumers to repair their vehicles in independent workshops using spare parts is gaining momentum. This opens up new opportunities and encourages competition. At the same time, online purchasing platforms and spare parts for electric vehicles are also booming, forcing players to incorporate a sustainable and digital dimension into their strategy.

Aware of these challenges, NTN Europe is taking steps to meet the needs of this region and strengthen its presence there. In FY 2023, NTN Europe's HGV and LV offering attracted new customers in key markets that had previously

been untapped, such as Congo, Kenya, Saudi Arabia, Egypt and South Africa. To achieve this, sales channels are being actively strengthened. Qualified local talent, such as Benjamin EDWIN in charge of sales growth in South Africa, is being recruited. Training sessions are organised to improve distributors' technical and commercial skills. And strategic partnerships with key distributors are formed.

This year, NTN Europe, whose presence in these markets is relatively recent, continues to understand their regulatory environments and local dynamics in order to exploit their strong potential. The growth in the fleet, expected over the next decade, should further stimulate demand for spare parts. The company will therefore continue to introduce new product lines tailored to the Middle East and Africa market, including high-performance parts for demanding applications. Partnerships with local distributors and players will be strengthened and the right to repair movement will be supported by NTN Europe by guaranteeing the availability of parts and supporting independent workshops in order to promote a competitive and fair market.

In Brazil

The Group's dynamism, the strength of its NTN and SNR brands, its expertise in OE and the developments made for the aftermarket, mean that NTN Europe can look forward to constant growth in Brazil in the coming years. The South American subsidiary ensures its local presence thanks to the distribution centre located in Campina Grande do Sul-PR, whose mission is to meet all demand in the region. NTN Europe maintains close relations with its distributor customers in order to better understand their needs and support them. Highly appreciated actions such as technical training on NTN and SNR products are organised in the different regions of Brazil. At the same time, NTN Europe invites its customers and prospects to visit its factory to discover the quality of its bearings throughout the production line. The equipment manufacturer also takes part in the main Brazilian motor shows, such as Autopar and, for the first

time in 2024, Centro Parts in Goiânia, in the central region of Brazil. The presence of the Brazilian sales team at Automechanika Frankfurt, which has an international profile, is also very important in raising the brand's profile in Brazil. Finally, to stand out in this market, NTN Europe communicates widely through the press, its social networks and sponsorship of key events in the automotive sector about the original quality of its products.

In the Germany, Austria and Switzerland regions

In Europe, and particularly in the DACH region, workshops favour high quality spare parts, making this a prime market for NTN Europe. Synonymous with reliability, performance and safety, they make it possible not only to maintain high service standards, but also to build long-term customer loyalty. Another trend is driving the market: the rise of electric vehicles (EVs) and connected cars. On the one hand, this is forcing workshops to train and invest in new equipment to deal with increasingly complex technologies. And on the other side, it is forcing equipment manufacturers to innovate, on parts such as wheel bearings, to meet the challenges of optimising weight, robustness, reducing friction, and so on. To stand out in this highly competitive market, NTN Europe focuses on the quality of its products and capitalises on the relationship of trust it maintains with its partners by meeting them at trade fairs and training sessions. As part of its CSR commitments, a training program has been launched in prisons in 2023 to help prisoners reintegrate into society. The equipment manufacturer is also rolling out its extensions and new ranges in the DACH region through strategic campaigns. NTN Europe's objective is to establish itself as a multi-product one-stop-shop, covering as many applications as possible, including the most recent, as part of a first-to-market policy.

In Italy

NTN Europe has been present in Italy for 50 years, where it occupies a leading position as an OE manufacturer. With its wide range of bearings, the

equipment manufacturer addresses the industrial, automotive (original equipment and aftermarket), HGV and motorbike markets. Far from limiting itself to the wheel bearings for which it is renowned, NTN Europe has succeeded over the years in winning over its Italian customers with a high-quality product portfolio that is as rich as it is diversified. Distribution kits (with and without water pumps), suspension bearings and gearbox bearings are particularly popular. In recent years, buoyed by a buoyant market, NTN Europe has been able to develop its activities there by consolidating and expanding its partnerships. Thanks to a strengthened, competent team, present on the ground and the quality of its products, the equipment manufacturer's results have outstripped those of the market. Today, the equipment manufacturer continues to capitalise on its image as a premium manufacturer and is deploying the latest ranges launched by the Group to develop the reputation of its SNR and NTN brands in Italy.

In the United Kingdom and Ireland

Ranked 4^{ème} in Europe and 9^{ème} worldwide by volume, the UK automotive aftermarket is flourishing.

The UK benefits from strong trade links with its European neighbours such as Germany, France and Spain.

This dynamic sector is growing steadily, with a rapidly expanding fleet of vehicles, but one in which it is difficult to carve out a niche. In order to achieve this, NTN Europe's UK team is completely revising its commercial strategy in the UK to approach new customers and develop the brand's presence there.

In Ireland, the trend is to sign new agreements with major suppliers in the market. This step will ensure the growth of the equipment manufacturer's sales over the coming years. The shock absorber range, launched in early 2024, has been well received by the market.



In Portugal and Spain

As in the rest of Europe, the Portuguese and Spanish markets are seeing their car fleets age. With inflation, the purchasing power of users is reduced, leading to a demand for more economical products in some cases. NTN Europe, however, continues to perform well. In Portugal, 2023 was a good year overall, according to market players. NTN Europe is strengthening its relationships with existing customers, which has enabled it to record very satisfactory growth. In the case of Spain, the evolution is also very positive. Both in 2023 and in the first months of 2024 we have had results above the sector average if we compare it with the data of the activity study carried out by Sernauto.

In France

Driven in particular by an ageing fleet, sales of technical parts in France have been rising steadily for some years now. According to AAA Data, in January 2024, the automotive market consisted of more than 40 million private vehicles. With 73% of these vehicles over 5 years old, the average age of the fleet has reached a record 11.69 years. A similar trend can be seen on the LCV side. The average age is 11.38 years, with 66% of the 7 million LCVs on the road over 5 years old. Against this backdrop, and in response to the development of private labels, NTN France's sales are doing very well. Since the beginning of 2024, they have also been boosted by the excellent results achieved by the new product families launched (shock absorbers, chain kits, etc.) and the promotional campaigns carried out. Pro Days, for example, are always a great success. To maintain close links with its distributor customers, NTN Europe's French subsidiary also resumed its visits to the NTN plant in Annecy and the NTE plant (specialising in transmissions) in Le Mans this year. Alongside the CTA (Club Technique Auto), co-founded with CLAS and Elring, NTN Europe is also forging closer links with repairers through its distributor partners. During the training sessions organised, the equipment manufacturers were able to share their technical advice, invaluable in

the workshop, with more than 1,000 MRAS. The 1.2-litre PureTech and EcoBoost engines are at the heart of the latest developments, and will continue to be the focus of training sessions in 2024.

Appointment to the EMEA and Brazil Sales Department

On 1^{er} July, Leonardo ARAUJO left the position of Sales Director for the EMEA and Brazil region, which he has held for the last 3 years, to take up the position of President of the Brazilian subsidiary of the NTN Group. He has been succeeded by Pascal LANGER, Head of ITG (International Trading Group) at NTN Europe since 2020. Of Franco-German origin, he began his career in the aftermarket in 2002 with the VALEO Group. He went on to work for other big names in the aftermarket, such as Delphi and TMD Friction, first in France and then in Germany. From 2016 to 2020, he held international marketing and sales positions at TEMOT International and InfoPro Digital before joining NTN Europe's Automotive Aftermarket division as Head of ITG.



Pascal LANGER

Regional Sales Director
EMEA and Brazil

"Created in 2020 to boost relations and sales within the ITGs by forging closer links with them, this position has been an excellent opportunity to put my professional experience to good use. Thanks to an approach geared towards these international groups and by taking part in several strategic projects, we have clearly strengthened our positions within them," says Pascal LANGER.

On the strength of this additional experience, Pascal LANGER has taken up his new position as Sales Director for the EMEA region and Brazil from Germany, still working in the team of Christophe IDELON, Vice President Automotive Aftermarket of NTN Europe, to whom he reports. In this role, he will be responsible for continuing to develop Automotive Aftermarket sales by focusing his strategy on two major areas: a major extension of the product ranges and expansion in countries in the EMEA-Brazil region where there are significant growth opportunities. To meet these new challenges, he can count on a fully operational sales team, reinforced by his predecessor, in Europe, Africa, the Middle East and Brazil. In order to continue supporting international groups, Pascal LANGER will continue to carry out his previous duties on a temporary basis, pending the appointment of the new Head of ITG.

"I'm delighted to see Pascal move up in the sales team with this appointment. The skills he has acquired throughout his career on international assignments, the work he has done with the ITGs, his mastery of our product portfolio and his abilities promise great success in the position of Sales Director EMEA and Brazil," says Christophe IDELON.

Innovation in EO, a major asset in times of change

In recent years, new vehicle production has stagnated at a record low in Europe (-20% compared with 2017). The automotive market is mainly driven by environmental issues, such as the ban on the sale of new combustion-powered vehicles from 2035. This is pushing European manufacturers to speed up their development of electric powertrains (hybrid and 100% electric) in order to remain competitive with other nations that are further ahead in this field, such as China.

As the OE partner of the world's leading manufacturers, NTN Europe is simultaneously developing its products, most of which are used in electric vehicles, to adapt them to the new constraints of electric vehicles. This change is a real opportunity to innovate in response to three major issues in particular: increasingly demanding operating and mechanical integration conditions, the rise of sensors enabling the vehicle to interact with its environment and, finally, the quest for carbon neutrality through more durable components. Here are a few examples of solutions developed by the Group with this in mind.

A project for special ballscrews

The change in the fleet is also leading to the electrification of certain assistance functions, previously hydraulic or pneumatic, which are now powered by linear electric actuators. The ballscrew is a major mechanical component of these actuators, precisely transforming rotary motion into translational motion. It is also more efficient than the screw-nut assembly used in belt-driven motors, and its service life is predictable, so it can be replaced sooner.

With its expertise in the integration of rolling bodies into rotating components, their machining and lubrication, the NTN Group has been renowned for the reliability of the ballscrews it supplies to the industrial sector and for its electro-hydraulic brakes for over 10 years. Faced with the electrification of the vehicle fleet and as part of its "Nameraka" approach, the Group is now drawing

on this solid expertise, its 2 R&D centres in Europe and Japan and its systems engineering approach to design a global range of specific ballscrews for braking, active suspension and steer by wire functions.

Based in Annecy (Haute-Savoie, France), NTN Europe has positioned itself in this high-potential market by starting from the customer's needs and developing specific products, perfectly adapted to their use. The choice of materials and greases is made in specialised laboratories to establish the most reliable, high-performance combination. Most of the components are manufactured in-house and by geographically close suppliers. The French team works closely with Japan, which has similar facilities (design office, prototype workshop and test centre), to share their knowledge. This enables the Group to react quickly when it comes to designing and producing prototypes, and to offer its customers a global presence while benefiting from local support.

The Group is already involved in a number of development projects in partnership with equipment manufacturers with precise specifications for braking systems, active suspensions and purely electric steering columns. These projects are at the prototype stage, and some are in the advanced testing phase at customer sites, with production start-up envisaged by the end of 2027.



A compact wheel bearing and transmission assembly

As an OE supplier of wheel bearings and transmissions, the NTN Group is reviewing and optimising the structure of these components to meet the weight, space and noise constraints imposed by electric vehicles. The compact solution proposed by NTN is at the prototype stage and is being tested and evaluated by the Group's OEM customers.

To compensate for the small footprint, facilitate integration and avoid weighing down the EV, the wheel bearing and transmission assembly must be as light and compact as possible. Used to being challenged on this point to improve the steering angle of vehicles, NTN Europe drew on its know-how to redefine the bearing-transmission interface, which is usually inaccessible. Its expertise in mechanical dimensioning was also put to the test in order to guarantee a bearing life and rigidity that met market requirements. The new architecture has resulted in a 35mm gain in axial compactness, enabling vehicles to gain up to 3° in steering angle. A significant advantage for both EVs and small city cars looking for improved manoeuvrability.

At the same time, as the engine environment of an EV is quieter and the torque generated by this engine is greater, contact noise in the interface between the transmission and the bearing is sometimes perceptible to the driver. To reduce this phenomenon, NTN Europe is working on modifying the geometry of this interface.

An eco-responsible suspension stop

To achieve carbon neutrality, which is at the very root of the electric vehicle boom, every component of a vehicle must be as sustainable as possible. With this in mind, NTN Europe has developed an eco-responsible suspension strut bearing with an innovative composition. This strut bearing combines a recycled polyamide cover and a recyclable aluminium support. By using fewer virgin raw materials while benefiting from reduced mass, this durable bearing saves :

- up to 4.8 kg of CO emissions₂ throughout the vehicle's life cycle,
- up to 3.6 kg of CO emissions₂ during the manufacturing and end-of-life phases.

The recycled polyamide used for the cover guarantees a high level of technical performance with good stability, close to that of a virgin premium material. The aluminium support, meanwhile, meets the cost objectives as well as the requirements of electrical applications, particularly in terms of robustness. More rigid than plastics, it reduces deformation by 40%, and therefore reduces the risk of failure and returns under warranty. It is also lighter. With a weight saving of 80 g, up to 1.2 kg of CO emissions are saved₂ for every 150,000 km travelled by the vehicle.

This durable bearing is now available on the market. NTN Europe's close relationship with vehicle manufacturers has encouraged it to take this project even further, by imagining new futures for the suspension thrust bearing.



Innovation Awards: An innovative solution for airflow from the chassis to the wheels

This chassis-to-wheel airflow solution, which was submitted to the Innovation Awards jury at Automechanika 2024, is the result of collaboration between NTN Europe and Teleflow. Teleflow, a Michelin Group subsidiary and leader in CTIS (Central Tire Inflation System) solutions for military applications, is looking for a partner to integrate its technology into civilian vehicles. Continuous monitoring of tyre inflation and their re-inflation or deflation while driving will set a new standard in terms of safety and reduce fuel consumption.

The Teleflow remote inflation system automatically adapts tyre pressure to road conditions, helping to optimise the vehicle by :

- reducing the vehicle's fuel consumption by 4%,
- increasing tyre life by 15%,
- improving user safety.

It consists of 3 elements: a control console in the passenger compartment, an electro-pneumatic unit that controls the air distribution and four valves, mounted on the rims, that inflate or deflate the tyres. However, to implement this technology on a civilian vehicle, we need to find the least intrusive solution possible to bring the air from the chassis to the valve on the wheel.

It is at this key stage that NTN Europe, world leader in wheel bearings, intervenes. For original equipment, the structure of the wheel bearing has been revised to incorporate an air passage, while maintaining a compact, lightweight part that is easy to fit. The challenge is to create the air passage within the hub, ensure a seal between the bearing and the air flow, while controlling the increase in torque associated with the addition of the air passage seals. At the end of 2025, these innovative bearings, still at the prototype stage, will be evaluated during a second phase of real-life vehicle testing.

As a replacement, this air passage is integrated into a track widener that is positioned between the wheel hub and the wheel to allow air to circulate from the chassis to the tyre. This minimally intrusive SNR solution includes a rotating seal in a 25 mm to 30 mm disc to protect the air passage. It can be easily fitted by technicians to add a key function, particularly for off-road vehicles.

The NTN logo is displayed in white, bold, sans-serif capital letters on a blue rectangular background.

Make the world **NAMERAKA**



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