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PRESS RELEASE

NTN-SNR INNOVATES – CV JOINTS AND TRANSMISSION BEARINGS WILL BE LAUNCHED AT AUTOMECHANIKA!

At the Automechanika 2016 trade fair, which will run from 13th to 17th September 2016 in Frankfurt, NTN-SNR is launching two new ranges: a range of constant-velocity (CV) joint kits intended for vehicles registered in Europe and a range of bearings for transmissions. It will also extend its existing range of wheel bearings. The market has been keenly awaiting these two new offers, especially in the two sectors where NTN-SNR has already demonstrated its OEM know-how., NTN-SNR will also present the second version of TechScan'R, an application for smartphones and tablets intended to enable repair shops and dealers to access technical information under any conditions.

There users will also find the complete NTN-SNR product range, hereafter structured into three major poles for better clarity: Chassis, Powertrain and Driveline. These advancements perfectly illustrate the development strategy championed by Eric Malavasi, NTN-SNR Vice-President of Automotive Aftermarket: offering the full line of original products to the automotive aftermarket in order to respond to market needs, relying on innovation and developing an expanded service offer in order to make NTN-SNR a true partner to its clients, today and for the long term.

Extending the full OEM range to the aftermarket

Phase one is to supply CV joint kits to the European aftermarket

NTN-SNR is relying on NTN Transmission Europe and its factory in Le Mans, France, to roll out its line of CV joint kits for the automotive aftermarket. That product line extends from the complete CV joint kit to a kit including bellows only and also includes kits for outboard CV joints and inboard CV joints. This will, during an initial phase, enable NTN-SNR to offer original equipment parts to the market, including the benefits of eight-ball joint technology. The latter takes up less package space and reduces noise levels. Eventually, NTN-SNR expects to supply replacement CV joint kits covering up to 95% of all cars currently in service.

Transmission bearings awaited by the HGV market

NTN-SNR is launching about a hundred transmission bearing part numbers on the HGV aftermarket. The market has been especially looking forward to these bearings, which NTN-SNR already supplies as OEM parts in large volumes to the Europe's biggest constructors, such as Mercedes-Benz, Volvo Trucks, and Renault Trucks.

New range of HGV wheel bearings

NTN-SNR is increasing the number of HGV wheel bearing articles available for the aftermarket to 142 part numbers in all. Those bearings include some high value-added bearings (part no. HDSxxx) used as OEM components in premium HGV models such as the Actros of Mercedes-Benz.

Three major product categories and one service category enhance the range with new legibility.

Automechanika is also an opportunity to present the entire NTN-SNR product range in a larger sense – a range organised into three major poles. The first, Chassis, includes wheel bearings, suspension bearings, brake discs, and now CV joint kits. Powertrain, features parts for timing and auxiliary belt systems, while Driveline is for transmissions. The Service category which has now been added to those three product poles reflects the company's resolute strategy aimed at supporting its clients and partners.

A leading company in motion

A strategic expansion of range, innovation and service delivery

Éric Malavasi, Vice President of Automotive Aftermarket for NTN-SNR, will be presenting his major strategic outlines, specifically reinforcing the presence of NTN-SNR in all automotive aftermarket segments: *"We are developing our range in order to assert ourselves in the automotive aftermarket as the multi-faceted specialist that we already are in OEM. With these new aftermarket offers in automotive CV joints and HGV transmission bearings, we are investing in sectors where we are already a major, recognised OEM player. In this way, we are responding to a strong market demand."*

Innovation and services will not be outdone and as Christophe Espine, director of marketing for the Automotive Aftermarket business unit, emphasizes, *"Innovation, whether it comes from OEM development or is specific to the aftermarket, is there to enhance our offer. In particular, our clients can experience TechScaN'R, which is in its second version, a striking innovation in service, an area which lies at the very heart of our development strategy."*

You will find NTN-SNR at the Automechanika trade fair at stand C51, Hall 4.0

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NTN-SNR, MAJOR PLAYER IN BEARINGS AND MOVEMENT

NTN-SNR ROULEMENTS, headquartered in Annecy, France, is part of the Japan-based NTN Corporation, one of the worldwide leaders in bearings. NTN-SNR is responsible for the management and development of all NTN activities for the EMEA region (Europe, the Middle East and Africa) and for Brazil. As a major player that designs, develops and manufactures bearings and sub-assemblies for the automotive and aerospace industries and for industry in general, NTN-SNR offers a complete product range whilst also developing services and maintenance solutions. NTN-SNR employs 4225 people and operates nine production sites, six of which are located in France, along with 18 sales offices. It is pursuing a development strategy anchored along three major axes: strong innovation, presence in key strategic and future markets supported by numerous investments and provision of a service offering which emphasises quality and customer focus.

Activities in the automotive segment

NTN-SNR specialises in the automotive segment, with 70% of its operations dedicated to vehicle manufacture, and supplies practically all of the automotive manufacturers in the world. It established itself successfully on this market as the multi-faceted specialist in OEM and the aftermarket. Thus, NTN-SNR supplies a complete offer that covers the chassis, engine and constant-velocity joint (CVJ) families, whereby its most successful products include its 3rd generation bearings and its very high performance timing belt tensioners, as well as gearbox bearings. Leader in the European vehicle market, NTN-SNR has become the legitimate supplier of original equipment parts for Asian vehicle manufacturers in Europe – in both the OEM and aftermarket segments. Moreover, NTN-SNR is a partner in development programmes for electric vehicles and for tomorrow's innovations in order to reduce CO2 emissions from internal combustion engines. In particular, it developed an in-wheel motor system which is being used on different approved vehicles. It also created the PCS hub joint, an innovation which earned an award in 2015 and which significantly reduces the weight and space occupied by the power train.

Activities in the general industry segment

High-speed rail record-holder with 574 km/h, NTN-SNR is recognised as the development partner to the firms of the largest target markets for bearings. In the railway industry, NTN-SNR equips high-speed trains – Alstom's TGV and the trains of other major constructors – as well as trains for new regional train programmes. Its products are present in the major equipment and machinery used in construction and civil engineering, in mining and quarries and in the steel industry, for which it has developed very high performance bearings, including the ULTAGE range. It is building its presence in machine tools with a new investment in a production facility in Germany. Add to that the markets for agricultural machinery, agri-food equipment, pumps, motors and turbines, and mechanical transmission. Finally, in the trail-blazing market for renewable energies, NTN-SNR is a major partner of the biggest constructors of wind turbines and also equips solar power stations.

Activities in the aerospace segment

Partner in the first flight of the Airbus A380, the world's largest cargo plane, NTN-SNR bearings equip major aeronautics and space programmes, including the European launcher rocket Ariane and the CFM 56 turbofan engine, which is still the one most widely used by Airbus and Boeing. Above all, it is present in the developments of the engines of tomorrow: in particular, NTN-SNR is a developer for SNECMA's LEAP engine, which made its first flights on the Airbus A320neo in 2015 and on the Boeing B737 MAX in January 2016. It also supplies components for Pratt & Whitney GTF engines and Rolls Royce Trent XWB engines, which, together with the LEAP, equip the majority of new aircraft programmes. NTN-SNR is also a leader in helicopter power transmission. Having experienced continuous growth in the market for the past several years, it invested over 27 million euros in 2015 to expand and modernise its aircraft components production facility in Argonay, France.



R&D is the NTN-SNR's cutting-edge competitiveness. For the automotive market, its primary objective is to reduce CO₂ emissions by means of solutions which make it possible to lower energy consumption and thanks to developments in the field of electric vehicles.

PCS hub joint – a major innovation to enhance transmissions

In partnership with NTN Corporation, NTN-SNR has launched the PCS hub joint, a splined link between a CV Joint and a hub bearing. It is mounted with an interference fit using precisely adapted splines, thereby eliminating all play and reducing noise. This technology provides the required torque (technology which is adaptable from 2500 Nm to more than 7500 Nm) with a smaller diameter. That, in turn, significantly reduces the weight of the power train.

NTN-SNR has also reduced the mass of wheel bearings by the use of a compact bearing technology with an aluminium centring stem which also holds the tightening bolt used to attach the wheel hub to the CV joint assembly. A direct result of the NTN-SNR research plan, this development was awarded the International Grand Prix for Automotive Innovation's Silver Trophy at the Equip'Auto 2015 trade fair. The PCS Hub Joint is now in the pre-series prototype phase at a major vehicle manufacturer, which is one step before production in series production-line vehicles.



Prototypes to take innovation further

NTN-SNR contributed to Renault's Eolab prototype with weight savings of 25% and 30 to 40% higher torque. It also contributed to the Peugeot 208 HYbrid FE prototype, whereby the client imposed different constraints. Due to these bearing and drive train developments, NTN-SNR managed to reduce the weight of this vehicle by 6.6 kg.

NTN-SNR at the cutting edge of in-wheel electric traction motors

Working together with the Haute-Savoie-based constructor Lazareth, NTN-SNR helped to develop a small vehicle for urban traffic. Then, in 2015, they collaborated again on the development of the E-Wazuma, an electric three-wheeled motorcycle designed for the leisure market and equipped with two 30-kW in-wheel traction motors. Today the E-Wazuma offers performance and road handling comparable to the fossil-fuel-powered version with only slightly less horsepower. What's more, with an efficiency of over 90%, the engine delivers 490 Nm torque, which is higher than that generated by the internal combustion engine.

Managed by an extremely precise electronic control system, the resulting acceleration is remarkably powerful and smooth.

In 2013, NTN-SNR also presented a modified version of a production-line Honda Civic. Equipped with two 30-kW in-wheel traction motors at the rear with 490 Nm torque and a front-mounted battery, this vehicle can reach 150 km/h with excellent handling.

Modelling CO₂ emission variations

In addition and in order to help constructors satisfy the new Euro standards, NTN-SNR has developed Dylico2, a software program that provides an extremely reliable estimate of the CO₂ emission variations for a given vehicle depending on the type of bearings used. Finally, NTN-SNR has also established in-house expertise specialising in the development of new solutions relative to the architecture of internal combustion engines.

Research & Development

THE CENTRE IN ANNECY

NTN-SNR has a European R&D centre based in Annecy, France, with ample human resources and state-of-the-art equipment: four hundred people there create the products of the future with the aid of various laboratories (metrology, organic materials analysis, metallic materials analysis), “best in class” simulation tools and a test centre with more than 200 test benches. That centre works in collaboration with the NTN R&D centre in Kuwana, Japan, thereby enabling continuous exchange and merging particularly fertile knowledge and techniques.

R&D: 3.5 % of turnover 400 people



NTN-SNR, WORLDWIDE LEADER WITH A GLOBAL AUTOMOTIVE AFTERMARKET OFFER

NTN-SNR is one of the European leaders on the automotive aftermarket today. It guarantees the best quality parts, especially as major manufacturer of original equipment parts, for both European and Asian vehicles. Now It established itself successfully as a leading multi-faceted specialist by offering expertise in all automotive aftermarket areas. Grouped into three product segments – Chassis, Driveline and Powertrain – its entire product range is now clearer and more comprehensive.

A clear, global product range to address the markets better

NTN-SNR provides expertise in all areas of the automotive aftermarket and is It established itself successfully as a leading multi-faceted specialist by organising its entire product range into three product family types – to which it adds the family of services, **#SOLUTIONINSIDE** ((see page 11))



Chassis, #SECURITYINSIDE

Wheel bearings, suspensions, brake discs and CV joints

NTN-SNR is a leader in wheel bearing technology, especially with 3rd generation bearings, and is also establishing recognised expertise in brake discs with integrated bearings. It also has a strong presence on the market for suspension strut bearings and kits. For all of these “chassis” products, NTN-SNR focuses on the uncompromising safety that they provide to vehicle handling and thereby to the driver. **To that product family it is now adding its new line of CV joint kits (complete CV joints, inboard CV joints, outboard CV joints and bellows kits).**



Powertrain, #PERFORMANCEINSIDE

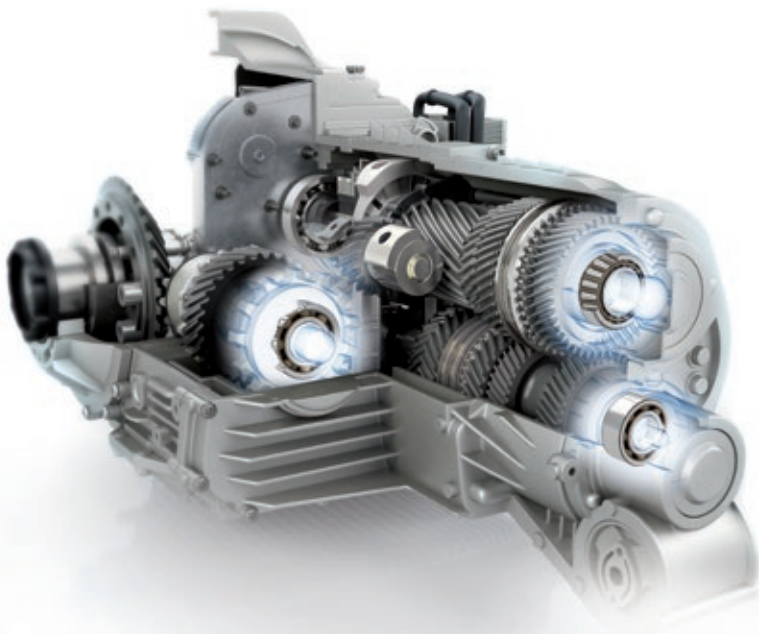
Timing and accessory belt systems

Performance is the primary feature of the engine components marketed by NTN-SNR. A major manufacturer of OEM tensioners and idlers, NTN-SNR supplies very high performance pulleys to meet the most demanding requirements (a roller can turn at speeds of up to 15,000 rpm), as well as high quality belts that ensure perfectly synchronised operation. NTN-SNR offers a full line of timing and accessory belt systems, including timing belt kits and accessory kits, timing belt kits with water pumps, tensioners, accessory belts, damper pulleys and overrunning alternator pulleys.



Driveline, #RELIABILITYINSIDE

Gearboxes are systems with no tolerance for approximation, demanding not only high reliability but also precision. That's why NTN-SNR markets extremely reliable bearings adapted to each type of transmission, with very low tolerances in order to guarantee that all play is eliminated. In OEM, NTN-SNR also supplies clutch release bearings to the biggest manufacturers and offers that product range to the automotive aftermarket.



The most extensive product range on the market

Whilst the product range benefits from a new segment-based approach, its quality is guaranteed by the depth of the range of NTN-SNR part numbers available to the automotive aftermarket. NTN-SNR markets more than 7,000 part numbers and provides for the continuous development of its range, adding 400 to 500 part numbers every year. The NTN-SNR automotive aftermarket product range covers 80,000 vehicle models, or 96% of all registered vehicles in Europe.

Moreover, it is developing specific product lines for HGV applications. That range is continuously expanding with, in particular, growth of more than 50% between the end of 2014 and the start of 2016 and the launch of a line of gearbox bearings in September 2016.

TWO NEW PRODUCT RANGES FOR THE AUTOMOTIVE AND HGV AFTERMARKET

NTN-SNR has established two new strategic product ranges on the aftermarket. First, NTN-SNR is starting the production of CV joint kits intended for the automotive aftermarket. In parallel, as a key partner to the major HGV constructors in Europe, NTN-SNR is launching a range of replacement transmission bearings, which the market has been awaiting with particularly keen interest, and is expanding its range of wheel bearings.



Launch of a line of CV joints for the aftermarket

Relying on the know-how of NTN Corp., NTN-SNR is launching its range of CV joints for the automotive aftermarket. The NTN Group is no. 2 in the world in the production of OEM CV joint kits today, with 40 million CV joints per year manufactured in 14 factories around the world. More than five million of those CV joints are manufactured for OEM in Europe – basically all of them at the factory in Le Mans, France. NTN-SNR is emphasising its expertise, especially with its 8-ball joint technology, which makes it possible to reduce the package space of the CV joint and provide better acoustic performance.

The first phase of this product launch is focused on Europe. The range comprises three families:

- **Complete CV joint kit** (shaft, inboard and outboard CV joints)
- **Joint kit** (inboard tulip CV joints or outboard cup CV joints)
- **Bellows kit** (2 sides)

This product range, which will be complemented by the full range of marketing supports already being provided for the existing product ranges, including brochures and Tech'Info bulletins, is intended not only for all dealers but also for repair shops. Note that NTN-SNR is incorporating this range of CV joint kits into its "Chassis" product segment, which includes wheel bearing kits, suspension components, and brake discs with integrated bearings.

Launch of the HGV range

Bearings for transmissions

NTN-SNR is a key partner of the major HGV manufacturers in Europe for OEM transmission and differential bearings. That makes it a major supplier to Mercedes-Benz, for example, and Volvo Trucks. So with this new aftermarket range, NTN-SNR satisfies strong expectations of the market in which it is a major player.

From the very outset of this product launch, NTN-SNR will be marketing 100 transmission bearing part numbers. It takes this opportunity to publish a new catalogue and new supporting material to accompany this product range. A second phase of implementation will involve bearings for the Asian HGV makes.

Expansion of the wheel bearing range

NTN-SNR increases the number of HGV wheel bearing articles available for the aftermarket to 142 part numbers in all. Some of these are fitted as original equipment in premium HGV models such as the Mercedes-Benz Actros.



Along with technical innovation, the quality of services is the other pillar of the NTN-SNR strategy. So in the automotive aftermarket area, NTN-SNR is rolling out a range of innovative services such as the TechScan'R app, as well as brochures on the analysis of technical failures, Tech'Info bulletins, installation recommendations, and a new, more ergonomic and intuitive online catalogue. In parallel, the e-Shop site, which enables customers to place orders online with instant information about the availability of the requested products, has been completely redesigned. With this range of services, which will continue to expand, NTN-SNR demonstrates its intention, first and foremost, to be a partner to its customers, today and over the long term.

Services family: #SOLUTIONINSIDE

TechScan'R, the smartphone app that makes life easier for repair shops and dealers

NTN-SNR is presenting version 2 of its TechScan'R app first launched at the end of 2015. This innovative app for smartphones and tablets allows users – both repair shops and dealers – to access crucial technical information. It constitutes part of the delivery of the range of NTN-SNR services.

TechScan'R, which is available from Apple Store and Google Play, provides access to information about a component through recognition of the NTN-SNR part number listed on the box, in catalogues, or on any other type of support, without the need for other add-ons, links or supplementary markers. The user simply scans the part number – that's all it takes to obtain all pertinent NTN-SNR technical information.



Forty-five different types of stored information are currently available:

- Classic quantitative data: dimensions, weights, number of components in the kits, etc., as well as the applications of the product, especially the types of vehicle on which they can be installed.
- Text data: presence of screws, roller type, product type.
- All product photos in high definition.
- Installation recommendations, specifications for associated products, paired parts, their “replaced” or “replacing” status.
- PDF files linked to the part numbers, numerous Tech’Info bulletins (see below) and other technical diagrams.

This V2 includes installation tutorial videos pointing to nearly 500 part numbers. The vehicle applications have also been added, making it easier to identify products.

TechScaN’R offers another striking innovation: the ability to view parts in augmented reality. For parts which have to be viewed from several different angles in order to identify them, this technology enables users to “play” with the image of the part “floating” over its box.

TechScaN’R now covers nearly 6,000 part numbers – practically the entire NTN-SNR product range. It is available in nine languages, with the ability to recognise the language of the user automatically. It offers an offline mode with access to stored favourites when there is no signal and sends notifications when a newer version of the application is available and/or favourites need to be updated.

Catalogues and e-Tools (e-Shop, e-Catalogue)

NTN-SNR provides catalogues for each of its product categories. The new Timing Belt System and Wheel Bearing catalogues were published at the end of 2015. In so doing, they have just completed the entire collection which has been fully updated over the course of one year, which also includes the Transmission, Suspension and Accessories catalogues. They are all available online and on e-Tools, the website where they are updated regularly.

Moreover, since March 2015, NTN-SNR has completely redesigned and expanded its online ordering (B2B) website, the e-Shop. That version upgrade displays all Group brands, new products and catalogue updates for the major business segments of the NTN-SNR Group, with the automotive aftermarket in the pole position. Thanks to their secure access, NTN-SNR customers can place their orders online when they wish, whilst taking advantage of up-to-date information in real time with regard to both product availability and order tracking. The e-Shop is available in eight languages (German, English, Brazilian, Spanish, French, Italian, Polish and Russian). Its usage rate can range from 20% to 80%, depending on the country.

Tech'Infos and "Failure Analysis" data sheets

NTN-SNR provides its repair shop and dealer customers with technical data sheets for installation and removal. By supplying very complete technical information covering all of the steps to follow for the installation and optimum use the components, these "Tech'Infos" enable service personnel to take a preventive approach in order to extend the service life of the components. About a hundred Tech'Info bulletins are available today in different languages for some 50 part numbers in the categories Chassis, Engine and Transmission.

NTN-SNR has also compiled two new technical documents on the analysis of failures that can occur with parts in its product range. This analysis involves the Wheel Bearing and Timing Belt/Accessories lines, examining the top 20 most common failures – here again, in order to favour a preventative approach.

Instruction and training

Teams from each NTN-SNR office can travel to the dealers in order to provide on-site support with the installation and specific technical features of the different product ranges and to conduct training seminars. Several training modules have been formalised, especially in the Chassis and Engine ranges.

AN ORGANISATION IN PROGRESS IN RESPONSE TO GROWTH

NTN-SNR has established a new organisation in order to be more responsive to market growth and to more and more demanding expectations for reactivity. That organisation is reflected both in the organisation chart implemented in 2015 and with regard to production and logistics sites.

A growth market

In a tight automotive market in Western Europe, NTN-SNR has managed to carry out a fundamental transformation in order to develop itself and to identify major growth drivers thanks to its sales strategy of international development. The latter is reflected, in particular, in the creation of new locations and in the reinforcement of some of its offices abroad, in the professionalism of its teams, their incorporation into the local fabric and the services provided to the customers.

After opening a subsidiary in Poland, NTN-SNR opened a subsidiary in Russia to respond to a strategic Central and Eastern European market.

South America, where the factory in Curitiba, Brazil, has been expanded, keeps its own local stock in order to provide better response times in that zone.

NTN-SNR is also present in Africa and in the Middle East, especially thanks to its large Moroccan subsidiary and to several offices in those areas where demand is strong.

Production

Most NTN-SNR automotive components are manufactured in France, where it has two large production centres. One is in Annecy and the other is in Alès, where NTN-SNR invested 20 million euros in a 7,000-m² production unit completely dedicated to 3rd generation bearings, which

opened at the end of 2013. That strategic investment responds to the massive implementation of this technological mutation among all major European, Asian and American constructors. In October 2014, NTN-SNR also celebrated the tenth anniversary of its factory in Sibiu, Romania, which has just seen a large increase in its production capacity, asserting its dominant position as a major supplier of bearings and transmission elements, especially for Dacia and General Motors in Romania. And finally, the NTN Transmissions Europe factory in Le Mans, France, which produces most of the 5 million CV joints per year supplied to Europe, saw its production capacity increased with three additional blocks and 15 lines.

EDC-A logistics centre

Completely dedicated to the automotive aftermarket in Europe, South America, Africa and the Middle East, the logistics centre (EDCA) in Cran-Gevrier, France, opened in early 2014. With a total of 24,000 m², it was designed, and is managed, by logistics specialists with an aim to optimise flow management and work conditions guaranteeing the comfort and safety of the workforce.

Managed by a distribution logistics specialist, this storage facility makes it possible to process 3,000 lines of orders per day and to dispatch 35,000 parts (or 40 tonnes) per day.

It has a shipping cell approved by the French Civil Aviation Authority (Direction générale de l'aviation civile, or DGAC), which handles the preparation and routing of packages approved for safe transport by air.



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