



Brand of **NTN** corporation

CVJ: CONSTANT VELOCITY JOINTS



What is a driveshaft?

An automotive driveshaft is responsible for transferring the engines rotational power or torque through the transmission to the vehicles drive wheels. The driveshaft directs the rotational power to the front or rear wheels or to all four wheels if the vehicle is four-wheel drive. They are subject to high stresses during rotation.

Two constant velocity joints, one on the wheel side, the other on the differential side, allow the same rotational speed between input and output shafts, whatever the position and angle of the joints are in.

The size of the joints and the length of the driveshaft depend on the vehicle design and the torque levels to be transmitted from the transmission to the wheels.

Different types of products

NTN Europe manufactures all types of classical joints, using a six ball design on the wheel side and differential side, on certain applications a tripod type joint can also be used on the differential side. NTN SNR have developed and patented a range of eight ball joints (EBJ and EDJ) which are **used by the Original Equipment Manufacturers (OEM)**. The design of these new products are attributed to the ever increasing requirements of the vehicle manufacturers and vehicle owners, comfort, reduction of CO₂ emissions and efficiency are the three main criteria in design and development.

EBJ Outboard (fixed joints)

Composition : *an outer race with inner race, cage, steel balls and boot.*

Developed to reduce size and weight, it helps the vehicle manufacturers to improve the compactness of the suspension unit.



EDJ Inboard (Sliding joints)

Composition : *an outer race, boot and tripod (or for ball joints: inner race, cage and balls)*

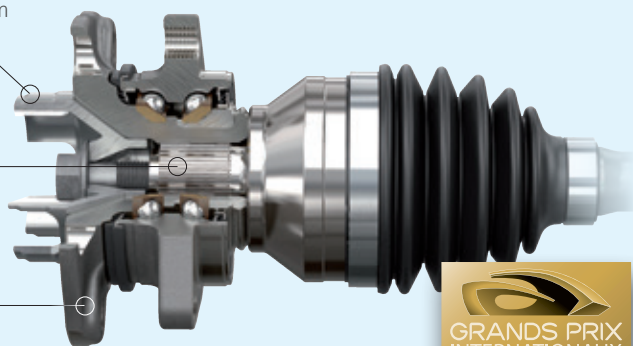
Developed to allow for improved transmitted torque, limits vibrational issues, and reduces operating temperatures



Aluminium hub pilot

Shorter splines

Lighter hub



PRESS CONNECTED SPLINE HUB JOINT (PCS HUB JOINT)

NTN Europe's award at the Grands Prix Internationaux de l'Innovation Automobile at Equip'Auto show in 2015 was thanks to PCS (Press Connected Splines) Hub Joint technology. This joint allows us to make components a lot more compact, this helps decrease the driveshaft's weight leading to reduced energy consumption and CO₂ emissions.



SNR quality

Vehicle owners demand more and more comfort, safety, fuel efficiency and reduced Co₂ levels in modern day vehicles. In parallel, vehicle manufacturers requests have become more and more technical: increased compactness and lightness, durability and greater efficiency. So today NTN Europe offers optimized products which satisfy all of these requirements

With increasing sales of SUV and pick-up style vehicles and higher vehicle car parcs in developing countries the demand for Constant Velocity (CV) driveshaft's is increasing.

Different levels of quality

- Parts from remanufacturing: used components are selected, reworked and reassembled. With a lower cost, these parts offer an uncertain level of performance in terms of life duration and quality
- Adaptable parts: developed for the aftermarket, these products offer variable degrees of quality and performance, due to the technical characteristics of these products not always being within the vehicle manufacturers specifications
- OEM parts: they are the only parts that respect the vehicle manufacturers requirements and specifications. This is the market segment targeted by NTN-SNR with its CVJ products.

FOCUS ON COMPONENTS

The correct functioning of a transmission depends on the quality of CVJ joints and correct assembly using the manufacturers fitment recommendations. NTN Europe attaches particular importance to CVJ and only offers high quality components.

Caution! Nuts, bolts, pins, and circlips are not reusable. Using low cost or copied parts can be dangerous. Visually these parts may look fine but, in most cases, do not meet the vehicle manufactures required specifications.

The driveshaft is a safety critical component



The range

NTN Europe offers a range of three CVJ products:

- Driveshaft kits
- Outboard wheel side joint kits
- Outboard and inboard boot kits

A driveshaft kit (DK) includes:

- The complete assembled driveshaft,
- Components for assembly such as nuts, bolts, clips ...

Assembled in our plants the driveshaft is complete and ready to fit. It is a quality product that assures a professional and complete repair.



The outboard joint kit (OJK) is pre-assembled and includes:

- The outboard outer race assembled (with inner race, cage and balls, ABS ring and dust cover).»
- Components for assembly such as nuts, bolts, clips
- Corresponding boot kit with bands, circlips and grease
- And the retaining ring for the differential side



The IJK joint kit on the differential side, pre-assembled, contains :

- The assembled tulip (with tripod, rollers and spring)
- Fasteners: nut, bolts and pin's
- The corresponding CV boot kit contains both the small and large clamps, circlips and a tube of CV grease
- Security rush



The out board boot kit (OBK) contains:

- The boot, boot clips circlips grease, nuts and washers
- Fastener components (nuts,bolts, pin...)
- All the required parts for the gearbox joint side.



Testing and maintenance

NTN Europe conducts bench tests in their test centres, in accordance with internal & customers' requirements. A complete driveshaft goes through many different tests:

- Durability and fatigue tests are carried out on the complete driveshaft as well as the outboard and inboard joints, link shafts (tubular or solid) tripods, splines and welded joints
- Static or quasi-static strength tests (a vehicle being driven up a curb with the steering on full lock)
- Abuse tests, important for vehicle manufacturers (this test simulates the clutch being released far too quickly causing wheel spin)
- Noise vibration harshness (NVH): this test is seldomly carried out by OEM driveshaft manufacturers, however the test by most sure the driveshaft is acoustically correct, this helps to keep noise levels and vibration at a minimum in the vehicle. NTN Europe skilled technicians routinely conduct these tests to help maintain the high quality of our CVJ products

PART NUMBERING SYSTEM

Driveshaft kit: DKcc.nnn*

Outboard wheel side joint kit: OJKcc.nnn

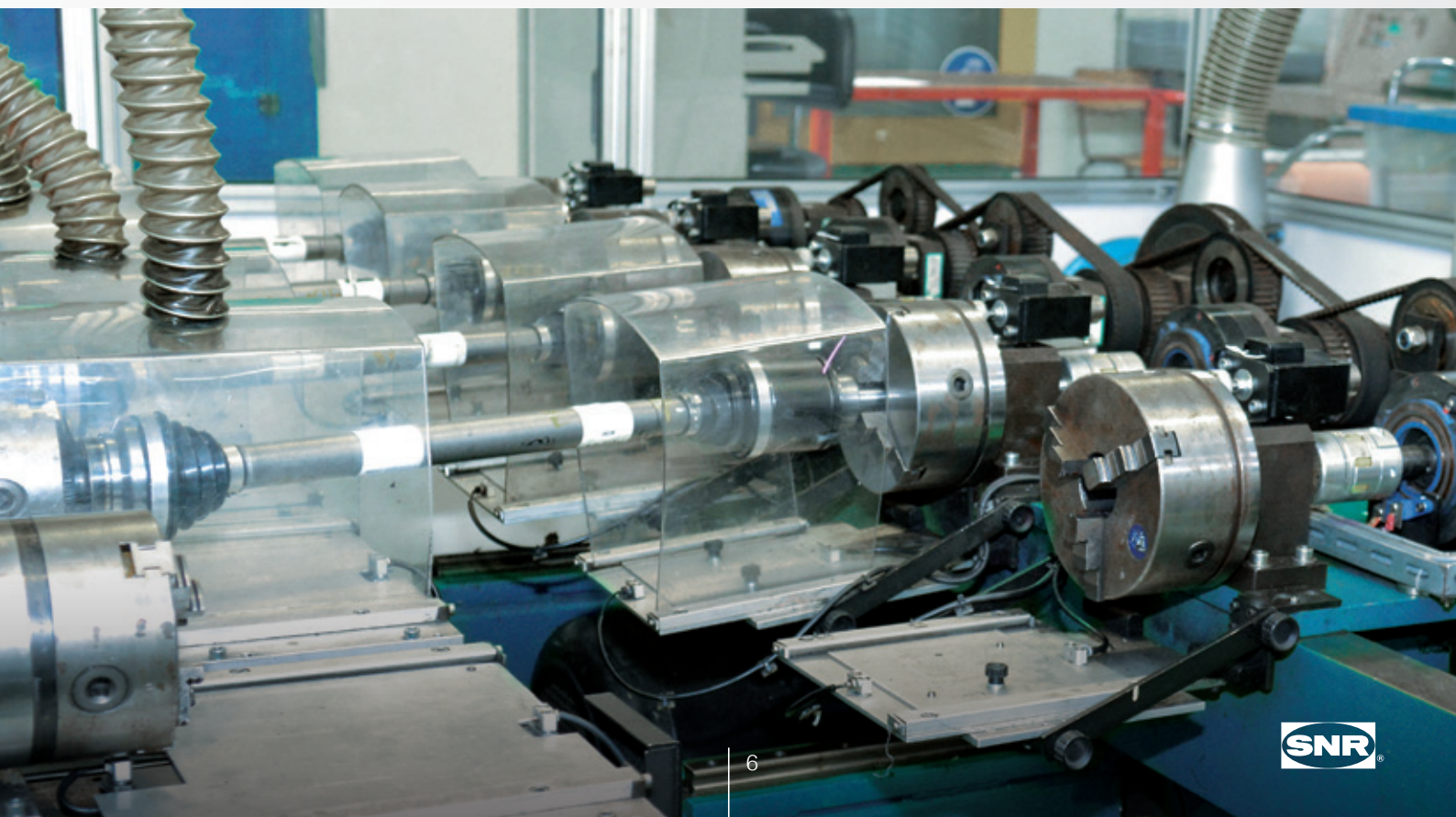
Wheel side boot kit: IJKcc.nnn

Differential side boot kit: OBKcc.nnn (outboard boot kit) / IBKcc.nnn (inboard boot kit)

* cc.nnn : Where "cc" is the carmaker code and "nnn" a sequential number of the kit

As the boots are the most sensitive components of the driveshaft, several kinds of test are carried out to make sure they perform correctly:

- Durability and extreme temperatures resistance tests (from -40°C to $+135^{\circ}\text{C}$ in some applications this can be $+165^{\circ}\text{C}$),
- Dilation tests to measure the deformation of the boot due to grease centrifugation



Lack of testing may put motorists at risk as a incorrectly manufactured CVJ may fail with the loss of drive to the wheels, increasing the chances of the wheel breaking away from the vehicle.

Replacements

Even if there is no abnormal noises emanating from the driveshaft the following parts should still be checked:

- The general condition of The surfaces which are exposed to the environment
- The correct tightening of the clamps
- The condition of the boots: make sure there are no cracks, splits or grease leaks.
- Significant play in the hub on the wheel and differential on the inner side.

CLAS[®]

NTN Europe recommends following the manufacturer's fitment recommendations (tightening torques of all of the nuts bolts and clamps) The use of CLAS tools is recommended where possible.

Reference: CLAS OM8024

Shell clamp: compression of the circlip so the CVJ can be pushed through the wheel hub side.



Reference: CLAS OM9396 + OM 0780

Tools to be used for the tightening of the boot clamps (Wheel and gearbox side)



Reference: CLAS OM8031

Tool kit: for the extraction and replacement the seals on the pivot



Why choose NTN Europe CVJ products?

- As the 2nd largest CVJ manufacturer worldwide NTN-SNR is an established and respected manufacturer, with more than 100000 parts being manufactured daily in its own plants across 5 separate continents
- R&D partner and supplier to the worlds vehicle manufactures, NTN Europe offers a large range of products for vehicle manufacturers throughout world such as Renault, Mercedes, Mini, Jeep, Opel, Nissan, Suzuki, Toyota, Dacia, Fiat, Alfa Romeo, Honda, Volkswagen, Ford, Land Rover, Volvo, BMW, Lotus...
- NTN Europe offers products tested and approved to its high quality specifications
- NTN Europe offers innovations, such as PCS and 8-ball joint, which provides better safety, comfort and reliability. Product information is available through technical support (TechScaN'R, TechInfos, etc.).
- All the components are included in the kit, helping make any repair simple, quick and reliable

The new CVJ range complements the CHASSIS range consisting of wheel bearings kits, brake disks with integral bearings, strut top bearings and suspension kits.

Trust in a world leading manufacturer,
choose SNR quality!



NTN

Make the world **NAMERAKA**



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