



NTN-SNR: productivity and maintenance solutions for mines and quarries



NTN-SNR ROULEMENTS is one of the world's largest global providers of products and solutions in the bearing market. For us, being close to you is the key to our combined success: what is better than sharing knowledge?

Irrespective of the type of activity (mines or quarries or surface mining), these change landscapes in an important way. It is difficult to measure the long-term negative impacts but these industries have been thinking about their impact for several years (vibrations from screening and transport by truck, noise, dust ...). The environmental integration of the sites at the end of life is consequently taken into account from the opening of a site or of the renewal of its license.

With concerns regarding environment preservation, NTN-SNR develops innovative and competitive solutions so that your equipment meets the standards demanded. In addition to maintenance products and services, NTN-SNR provides bearings adapted to vibrations, high-efficiency seals that guard against dust, long-life lubrications solutions... our engineers develop with You, for You, products resistant to the severest conditions.

NTN-SNR, With You



Your daily challenge: thrive in harsh applications, maintain productivity

The work done in a quarry is more than just the extraction of ore. A complete mechanical process is required to obtain a product with a specific granularity. At each step in the sequence, bearings play a vital role in a particularly demanding environment.

Transforming blocks of ore into granules

Once the blocks of ore are extracted, the first step is to reduce them to a size suitable for transportation and handling: this is the fragmentation process that involves crushing and then grinding. Granules obtained are anything but uniform and need to be sorted in order to classify them. This is the screening process.

Bearings put to the test

In a quarry, bearings operate in an environment that is extremely demanding. Major difficulties include:

- **Heavy Radial Load**

Every day, quarry conveyor belts carry thousands of tons of ore. Corresponding belt bearings are subject to extremely heavy radial loads.

- **Contamination**

Bearings must constantly operate in a dusty, damp and abrasive atmosphere.

- **Impacts, Unbalanced Loads and Vibrations**

The irregular shape of the granules in the crushers and screens intensifies the unbalanced loads producing ongoing vibrations as well as extremely violent impact loads.

- **High temperature**

In quarrying machinery, shocks, vibrations and heavy loads generate temperatures that can exceed 100°C (212°F/100°C).

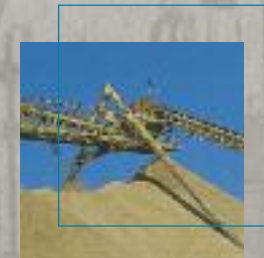
- **Rotating speed**

The speed is relatively low in most steps of the process, can be relatively important taking into account the size of the bearing.

- **Misalignment**

Potential misalignments between shaft and bearing housings are numerous in this type of environment.

To overcome the above difficulties, the number of moving parts in the bearing must be minimized, appropriate lubrication must be provided and the mechanical design and assembly must be flawless.



For each step in the ore preparation process, NTN-SNR has the efficient solution

Primary and Secondary Grinding



Each type of grinder, depending in the grinding process used, determines the choice of bearing.

Percussion Hammer Mill

- NTN-SNR spherical roller bearing (EM or B), Series 22300, 23200... C3
- Tapered or cylindrical bores

Jointed Percussion Hammer Mill

- NTN-SNR bearing special screen Series EF800 or UA (EM), C4, special tolerances
- Tapered or cylindrical bores

Jaw Compression Mill, for eccentric shaft

- NTN-SNR spherical roller bearing (EM or B), Series 23100, 23200... C3
- Tapered or cylindrical bores

Jaw Compression Mill, for main support

- NTN-SNR spherical roller bearing (EM or B), Series 22130, 23200... C3
- Tapered or cylindrical bores

Cage Mill

- NTN-SNR spherical roller bearing (EM or B), Series 22300, 23200, 24100... C3
- Tapered bore

Autogenic Mill, Ball & Bar Mill, rotary Mill

- NTN-SNR bearings, Series EF800 or UA

Primary and Secondary Crushing



Single or double acting jaw crusher

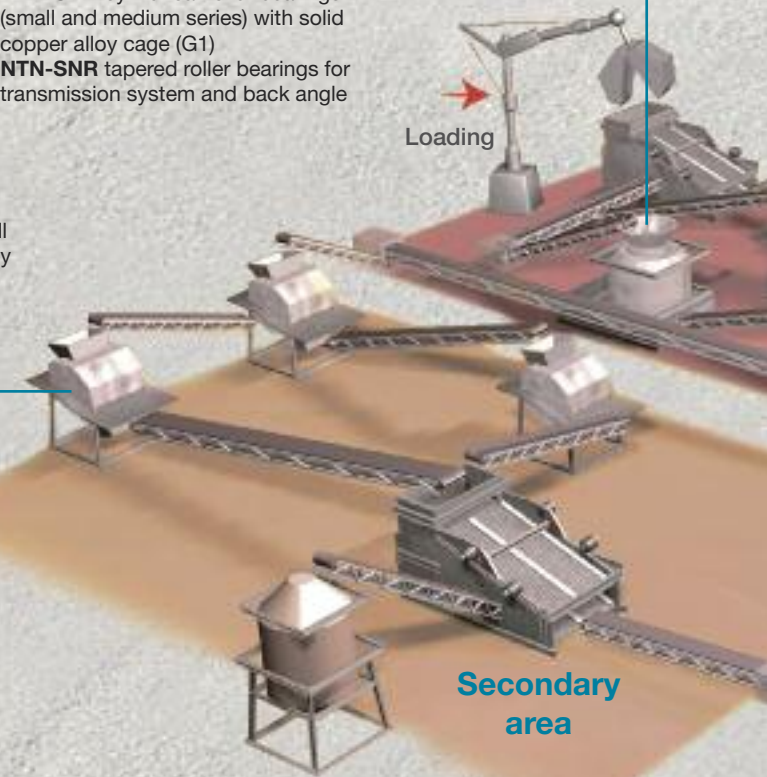
- NTN-SNR bearings, Series EF800 or UA
- NTN-SNR cylindrical roller bearings (small and medium series) with solid copper alloy cage (G1)
- NTN-SNR tapered roller bearings for transmission system and back angle

2 Toothed-Roll crusher

- NTN-SNR bearings, Series EF800 or UA
- NTN-SNR cylindrical roller bearings (small and medium series) with solid copper alloy cage (G1)
- NTN-SNR tapered roller bearings for transmission system and back angle

Rotary crusher

- NTN-SNR Single or double-row cylindrical roller bearing
- NTN-SNR tapered roller bearings for transmission system and back angle
- NTN-SNR single or double-row cylindrical roller thrust
- NTN-SNR one row tapered roller thrust



Loading

Secondary area

Primary and secondary screening

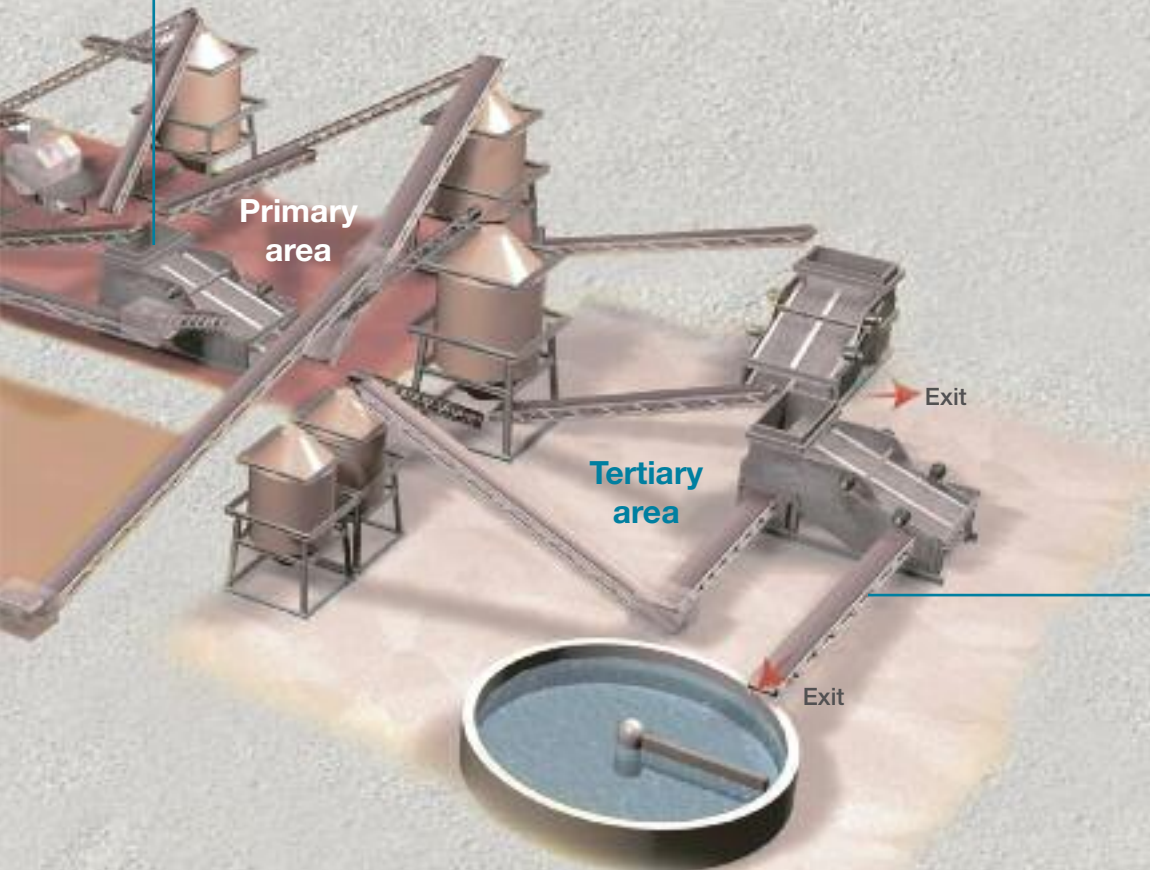


To extract the under-sized materials from the crushed ore, two successive screening techniques are used:

- primary coarse mesh screening, with vibrating bars or rotating screens
- secondary fine mesh screening, with shaker screens using perforated metal plates, trellises or various types of polymers.

Whether the screen type used is disk, eccentric, unbalances shaft, resonance or ellipsoid

- NTN-SNR range, **Series EF800 or UA**
- NTN-SNR cylindrical roller bearings (small and medium series) with solid copper alloy cage (G1)



Ore transport



Ore is carried from station to station by a number of means: loaders, washers, pumping units, conveyor belts.

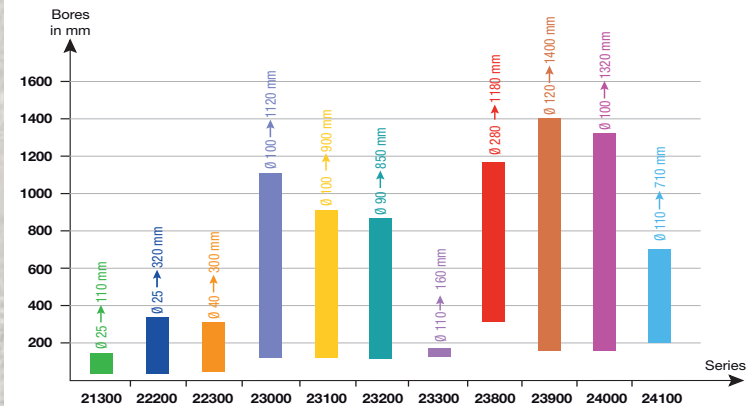
Alternating conveyor with Apron or Belt

- NTN-SNR cast-iron Plummer blocks equipped with self-aligning ball bearing, **Series 1200, 1300, 2200, 2300** or spherical roller bearing, **Series 21..., 22... and 23...**
- NTN-SNR cast-iron self-aligning mounted units (triple seals)
- Solid lubrication bearings

Pumping units

- NTN-SNR cast-iron Plummer blocks
- NTN-SNR spherical roller bearings, Series 22200 and 22300 (steel or brass cage)
- NTN-SNR angular-contact ball bearing

The spherical roller bearings range



Our offer for all your applications

NTN-SNR offers wide range spherical roller bearings made to resist to all difficulties of the quarries environment. The huge NTN-SNR experience allows increasing performance and life duration of its bearings to guarantee an optimum machinery operation and to reduce of maintenance costs. The new ULTAGE spherical roller bearings range is made to answer severest mechanism requirements such as primary and secondary crushers or public works machines.



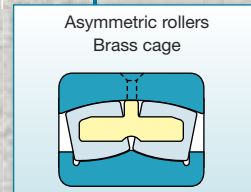
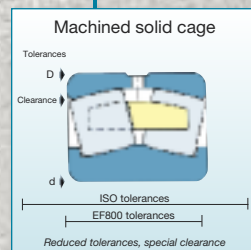
ULTAGE spherical roller bearings: more performance, less maintenance

High load capacity, high speed limit, running up to 200°C, sealed version, our bearings offer you compact solutions with an improved life duration, higher rotation speed which reduced operating and maintenance cost.

A performing range dedicated to highly vibrating applications like shaker screens and crushers

EF800 or UA series

- Suitable for very harsh applications
- Single piece brass cage: maximum stiffness and vibration resistance to increase life duration
- Cage guided on rolling elements providing more reliability: no seizure effect in a case of thermal expansion (only for EF800)
- Optimised assembly: reduced outer diameter and bore tolerances, tighter clearance for easier mounting and easier adjustment of the final clearance to prevent a detrimental radial preloading
- Available in 22300 serie with bore from 40 to 170 mm



EF800 and UAVS2 versions

- Special radial clearance: C4, positioned at upper 2/3rds of the C4 tolerance range (special clearance also available in C0 and C3 classes)
- Recommended fits:
 - Tight at housing, P6 class
 - Sliding at shaft, g6 class

UA version

- Bearing with specially treated inner ring which function is to delay the onset of corrosion (MX prefix)

An extensive range for all applications

With steel cage (EA)



- Suitable for standard applications
- Specific cage shape: excellent roller guidance to avoid overheating
 - Increased lubricant volume between the 2 rows of rollers to optimize the flow and improve life duration
- Available up to 190mm bore

With massive cage (EM or B)



- Suitable for harsh applications
- Single-piece cage: excellent shock resistance, high stiffness (B type: 1 massive cage by row)
- Cage guided on rolling elements for more reliability: no seizure effect in case of thermal expansion
- Available up to 1320mm bore

Sealed (WA...LL or EE)



- Reduces maintenance operations and increases service life
- Prevents ingress of contamination which improves grease and bearing life
- The sealing system can be fitted on standard bearing housings
- Although bearings are sealed, relubrication is possible
- Up to $\pm 0.5^\circ$ misalignment with same bearing performance
- Available in dimensions < 260mm outside diameter

Cast iron self-aligning bearing units



- Several housings (pillow block-, flanged-, take-up-, cartridge or hanger unit)
- Supplied pre-assembled, relubricatable or with a fitted insert lubricated for life
- Efficient protection against pollution with cast iron or stainless steel covers
- Efficient protection against corrosion by passivated surfaces
- Seals: 3-lip seal (L3) and 4-lip seal (L4)
- Easy assembly, layout of lubricator at 45°, positioning marks in most of housing units
- Optional additional covers, cast iron or pressed steel, with 2-lip seal to increase sealing and life duration



2-part pillow block: SNC standard range



- Better heat dissipation thanks to ribbing on the body and the regulation disk (20°C lower)
- 2-lip seal in 2 parts, felt strip seal, V-ring, Labyrinth seal (200°C, round cord as standard) as standard solutions or high performance TA Taconite seal
- Grease drain hole is standard for all housings
- 2 versions of lubrication fittings supplied as standard (flat or tapered headed)
- Markings on the housing foot for machining of new mounting bolts
- Excellent anticorrosive protection

On request, supply of specific models adapted to your applications

Special bearings for crushers



- Radial and Axial bearings with special dimension for Giratory crushers
- Cylindrical or taper rolles
- Brass massive retainers
- Crowned rollers to support extreme high loads

Example : 2R5215CS140PX1 = Radial bearing for Rollercone 45'

2-part special bearing housing



- Two versions:
 - 2-part bearing housing (lubricated with grease or oil) with an integrated self-aligning or spherical-roller bearing
 - A compact unit with a bearing or a combination of several other bearings
- Several shapes of plummer block housings, suspended housing, double or triple bearing housings and flange bearing housing
- One or several bearings, which are mounted either directly onto the shaft or which are attached with the aid of an adapter sleeve
- A device for re-lubrication of the bearings under running conditions
- Several types of sealing systems

	SNOE	TVN	TN	ZLG	DLG	ZLOE	722500	F11200	SD3100TS
Felt trips		X	X	X	X		X	X	
V-ring	X			X	X	X			
Double lips seal		X		X	X		X		
Labyrinth ring	X					X			X
End cover	X	X					X		X

Bearing units SPW/SFCW*/SPA**



- Quick assembly and interchangeable with SN / SNL / SNH / SNA assemblies
- Quick assembly to minimize downtime and maximise productivity
- Equipped with sealed spherical roller bearings, W222xx series
- Housing in one part
- Excellent sealing characteristics
- Phosphated for anticorrosive protection

Housing can be used as a fixed or floating bearing due to a spring retaining ring adjustment

*available on request
** inch size shaft height

Solid lubrication bearings

LP03 : -20°C to +60°C (80°C max.)
LP05 : -20°C to +120°C (100°C max. continuously)

Re-lubrication not necessary

Solve maintenance problems when bearings are not easy to access.

Resistant against contamination

Bearings with solid grease resist contamination such as dust, humidity.

Reduced lubricant leakage

Solid lubrication: eliminates grease leakage which ensures clean running applications.

Suitable in cases of centrifugal force and vibrations

The solid mass of the grease ensures an excellent resistance to centrifugal forces and ensures a consistent supply of lubricant necessary for effective operation.

Starting torque

At ambient temperature, low starting torque (compared to conventional grease lubrication).



Constant velocity joints: BJ, DOJ, TBJ

Smooth and quiet rotation

Allow smooth and quiet rotation, without angular speed variations.

Seals reliability

Seal with grease and caps which offer long life service and high seal performance in order to keep a clean atmosphere.

Lubrication for life

High performance of cap seals allow a long service life without maintenance (no grease leakage or water penetration).



NTN-SNR puts at your disposal a complete range of standard bearings for your equipment:

- tapered roller bearings
- single or double-row cylindrical roller bearings (SL, E version)
- roller thrust (tapered, cylindrical or spherical)

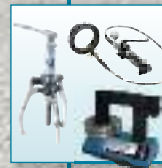


Maintenance and Services

The maintenance of mines and quarries must meet targets:

- **Economics**
 - reduced downtime
 - scheduled and quick operations
- **Technical proficiency**
 - increased service life for bearings thanks to precise and reliable lubrication
 - long-lasting installations thanks to the use of appropriate tools
- **Safety**
 - keeping staff away from at-risk areas: high temperatures, rotating parts, corrosive products and pollutants
 - preparation of operations
 - training of technicians in the safe use of the appropriate tools

Experts & Tools meets these targets with its range of maintenance tools and products combined with its services:



Tools suitable for quarries and mining equipments

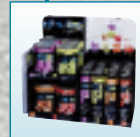
- Self-centring hydraulic pullers (up to a capacity of 20 tons)
- Hydraulic nuts (bore up to 1000 mm)
- Induction heater (for bearings up to 1200 kg)

These tools are also available to hire.

The complete LUB'SOLUTIONS range for reliable, safe and precise lubrication

- VIB, HEAVY DUTY and HIGH TEMP greases for the environmental limitations of each stage in the process
- Automatic lubricators dispensing those same greases
- Pumps and accessories for centralised lubrication up to 1000 points

Our experts can also provide their know-how to define, or even install, your systems.



Customised services for each situation

- Technical assistance for the assembly and dismantling of bearings
- Renovation of bearings removed during preventive maintenance
- On-site training of maintenance teams
- Diagnostics for damaged bearings
- Analysis of vibrations for the bearing, reduction gear, frame and machine base





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