



LONG-LIFE SEALED SPHERICAL ROLLER BEARINGS

FOR CONVEYOR PULLEYS IN MINING AND QUARRYING INDUSTRIES

The life expectancy of conventional spherical roller bearings for head, tail, drive, and tensioning pulleys on mining and quarrying conveyors is relatively short, often measurable in months. Hard particle and water contamination present a constant challenge to bearing life and, as a consequence, to mining plant uptime.

Breaking the relentless cycle of bearing failure requires an advanced approach to the problem. Enter NSK's long-life Tough Steel™ spherical roller bearing with removable seal.

PROVEN OPERATING ADVANTAGES

- ➔ **High performance seal design** provides protection against contamination ingress and can compensate for bearing misalignments
- ➔ **Easy and accurate installation** with bolt-fastened removable seal permitting clearance measurement during mounting
- ➔ **Long-life NSK Hi-TF steel** delivers longer service life in highly contaminated operating environments
- ➔ **Dimensionally interchangeable** with standard spherical roller bearings for modification-free upgrade

HIGH-PERFORMANCE FACTOR **ADVANCED REMOVABLE SEAL**

Fig. 1: seal lips contact the bearing inner ring when installed

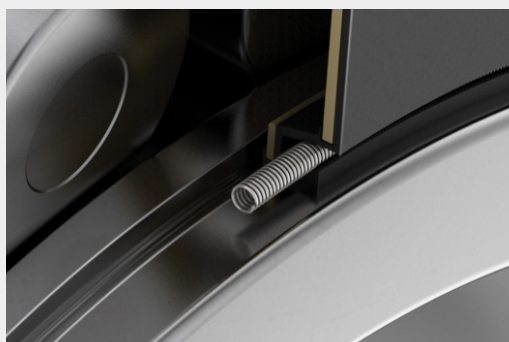
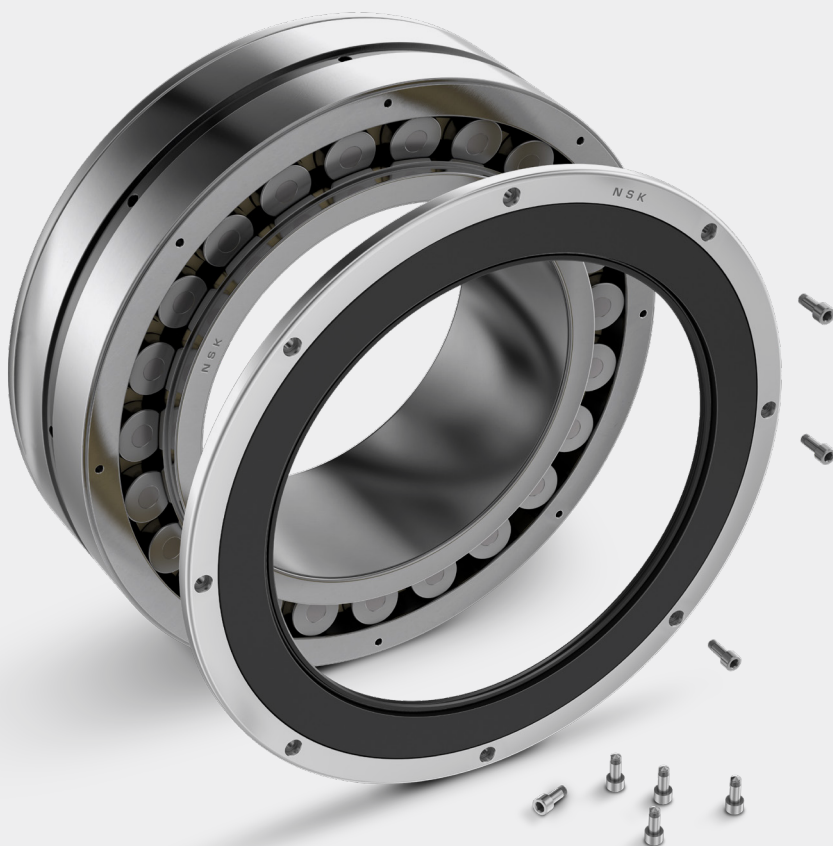


Fig. 2: integral garter springs deliver high sealing performance

NSK spherical roller bearings with removable seal are engineered to deliver substantially longer bearing life in contaminant-laden mining, aggregate and construction applications. The advanced, easy-to-install seal design provides optimal protection against particle and water ingress with considerable operating and handling advantages:

- ➔ **Seal lips contact the inner ring** with easy, bolt fastened installation (Figure 1)
- ➔ **Integral garter springs deliver high sealing performance** with compensation for misalignment (Figure 2)
- ➔ Hydrogenated nitrile butene rubber seal material is **stable at operating temperatures up to 100°C**



HIGH-PERFORMANCE FACTOR **LONG-LIFE TOUGH STEEL**

NSK spherical roller bearings with removable seals are manufactured with Hi-TF Tough Steel, engineered specifically to countermeasure the catastrophic impact of bearing lubricant contamination.

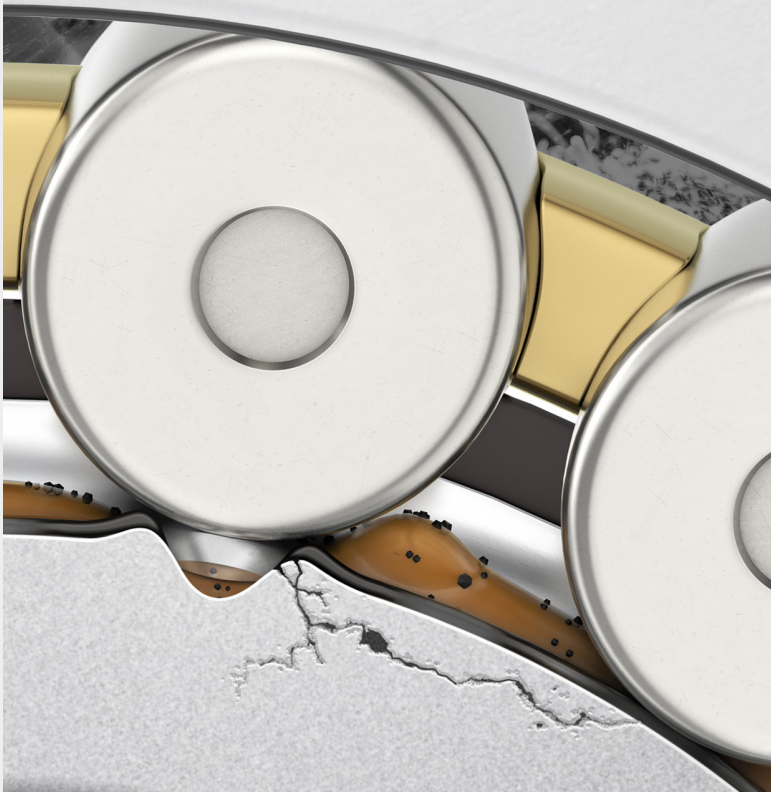
Our proprietary material composition contains appropriate levels of chrome and molybdenum. Coupled with an advanced carbonitriding heat treatment process, the result is a resilient, long-life steel that achieves both greater hardness and higher toughness and delivers longer bearing life in severe operating conditions with:

- ➔ **Superior wear resistance:** less than 1/3 the rate of wear of standard bearing steel
- ➔ **Greater seizure resistance:** as much as a 40% improvement
- ➔ **High heat resistance:** up to four times the service life at 160°C

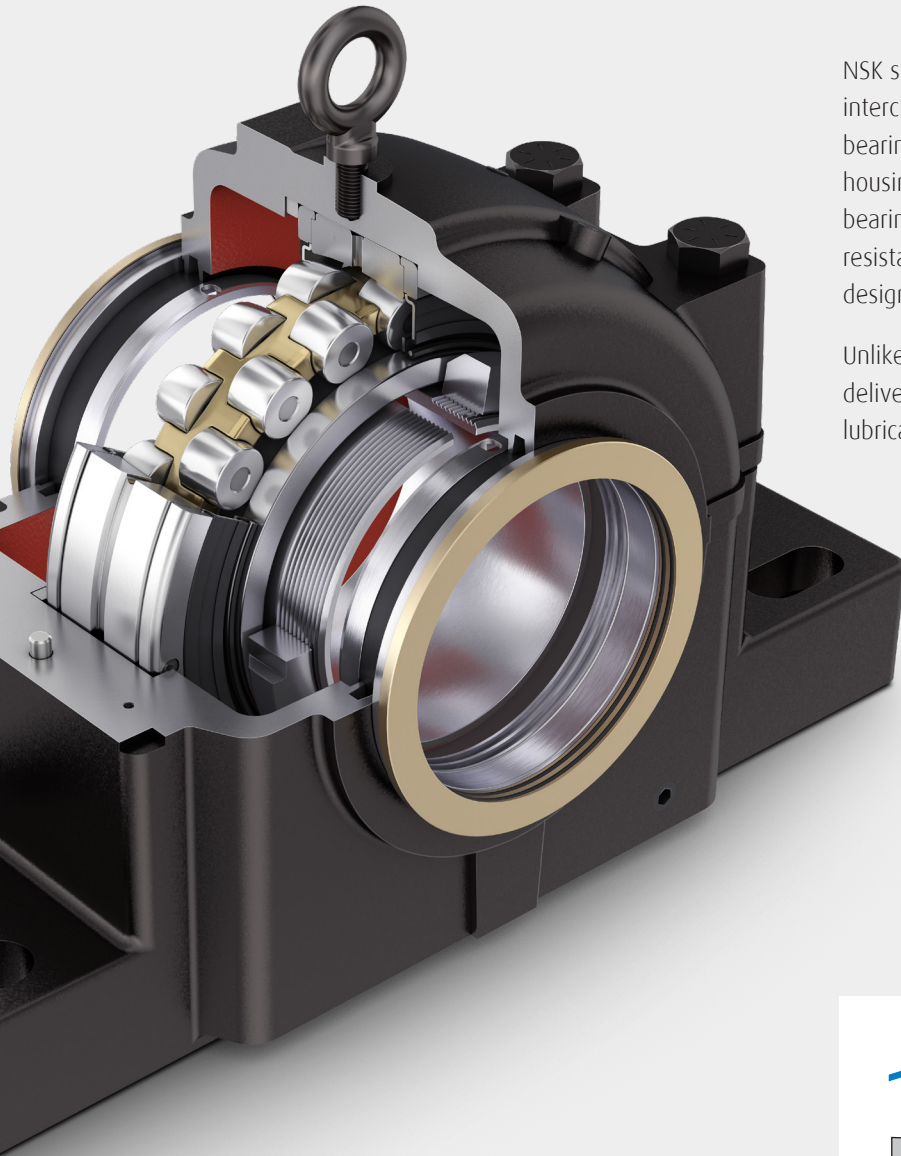
Under contaminated conditions that instigate progressive bearing damage and failure, **NSK Hi-TF bearings deliver as much as 7 times longer life** vs. general carburized options.

Life test: Result under foreign contamination

1	Catalogue life
0.2	General carburized steel
1.4	Hi-TF steel



Above: Particle contamination in bearing lubricant can lead to inner ring raceway denting, crack progression and ultimately bearing failure from flaking damage.

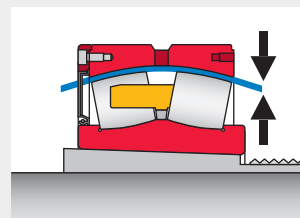
EASY-TO-INSTALL AND MODIFICATION-FREE ASSEMBLY UPGRADE

Above: NSK spherical roller bearing with removable seal mounted in an SAF housing equipped with OLB seals

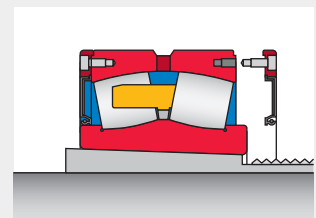
NSK spherical roller bearings with removable seal are interchangeable with standard ISO dimension spherical roller bearings, with no need for modifications to existing bearing housings or surrounding structures. They're available for bearing upgrade only, or for complete assembly contamination resistance with NSK's heavy-duty SAF housings and special design OLB seals.

Unlike bearings with integral seals, the removable seal design delivers considerable advantages for installation accuracy, lubrication and ongoing maintenance:

- ➔ **Appropriate internal clearance can be set during mounting**, eliminating the risk of bearing wear from vibration (too loose) or heat generation (too tight)
- ➔ Bearings are supplied without packed lubrication – **grease selection and fill amount appropriate to the application** and user preference occurs at the time of installation
- ➔ Removable seal ring **allows for inspection and relubrication**



Appropriate internal clearance can be set during mounting



Grease selection and fill amount are based on the application and user preference

CASE STUDY

APPLICATION

CONVEYOR PULLEY

COST SAVINGS

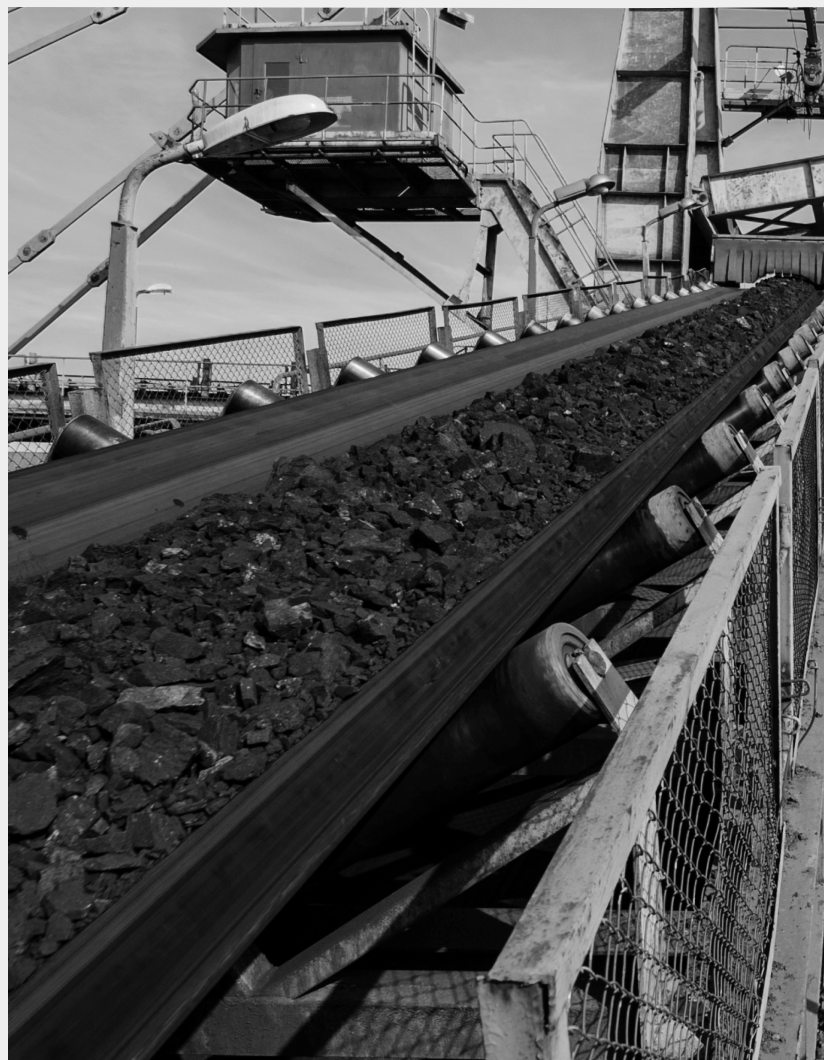
\$72,846

A customer operating an iron ore mining plant in Australia appealed to NSK experts to improve the performance of spherical roller bearings used in the bend pulleys of a critical conveyor, failing after 12 months in operation and incurring considerable replacement downtime costs.

The damaging effects of iron ore particle contamination presented the challenge for which NSK's long-life sealed bearings with Hi-TF steel are ideally suited. As anticipated, significant benefits were achieved by the customer with:

- ➔ **Longer operating life**, extending machine uptime an additional 21 months
- ➔ **Reduced production losses** incurred as a result of machine maintenance downtime

[DOWNLOAD THE COMPLETE CASE STUDY ▶](#)



YOUR PARTNER FOR MACHINE OPTIMIZATION

Our AIP Added Value Program is based around a simple proposition: 'improvement pays'. By working with you throughout the AIP Value Cycle, we will help you achieve improvements in machine reliability, productivity and performance, all of which carry a tangible and measurable cost benefit – and we have the tools to prove it! That's what we mean by **improvement pays**.



For the machinery and equipment used to extract, transport and process - interdependent in their purpose - access can be remote or restricted. The unexpected failure of a single component can bring an entire site to a standstill - at a significant cost.

Unexpected machine and equipment downtime is intolerable.

NSK rolling bearings are designed and manufactured to run harder, to run faster, to run longer. And to improve performance - mitigating maintenance and operating costs, improving throughput and profitability.

Learn more about NSK bearing products and services for optimizing machine performance.

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At right, NSK bearings for mining and construction, including:

1. Spherical roller bearings
2. Tapered roller bearings, single row
3. Cylindrical roller bearings
4. Full complement sheave bearings
5. Spherical roller bearings with removable seal
6. Tapered roller bearings, double row
7. Spherical roller thrust bearings
8. Cylindrical roller thrust bearings
9. SAF pillow blocks
10. Deep groove ball bearings
11. Angular contact ball bearings
12. Molded Oil™ bearings

